Phylum Platyhelminthes

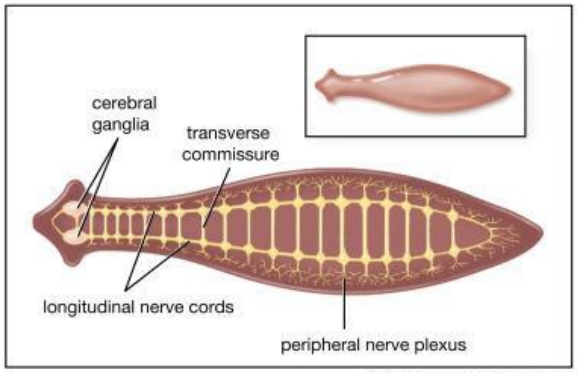
Learning outcomes: Describe the unique characteristics of Platyhelminthes

Characteristics of Platyhelminthes

- Known as **flatworms**
- **Soft bodies, unsegmented**, and flattened dorsoventrally
- **Triploblastic** animals – possess three cell layers (ectoderm, mesoderm and endoderm)
- **Bilaterally symmetrical** and **acoelomate** (no internal body cavity)
- Exhibit **cephalisation** – sense organs are concentrated at the anterior ends/head

- Has ladderlike nervous system
  - Comprises a pair of anterior ganglia – serves as the brain

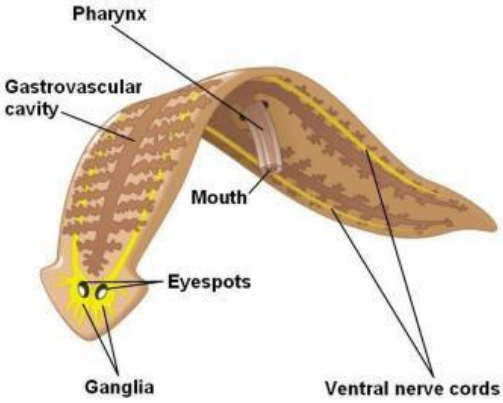
Nervous system of the flatworm *(Planaria)*



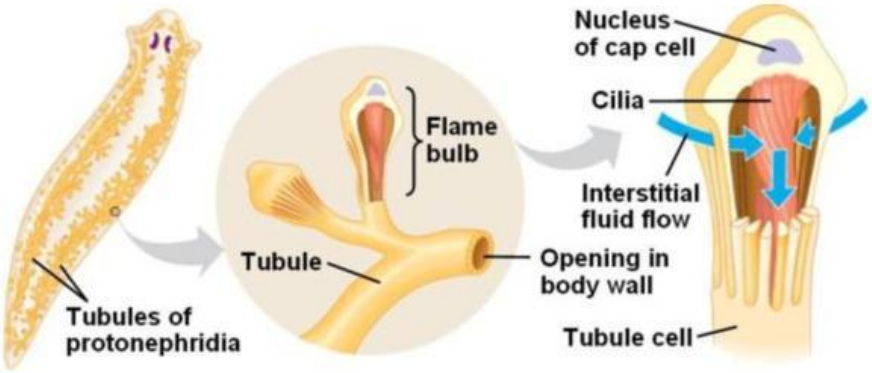
Phylum Platyhelminthes

Learning outcomes: Describe the unique characteristics of Platyhelminthes

Characteristics of Platyhelminthes



- **Digestive system** is **incomplete** – gut is sac like with single opening, pharynx extends for food gathering



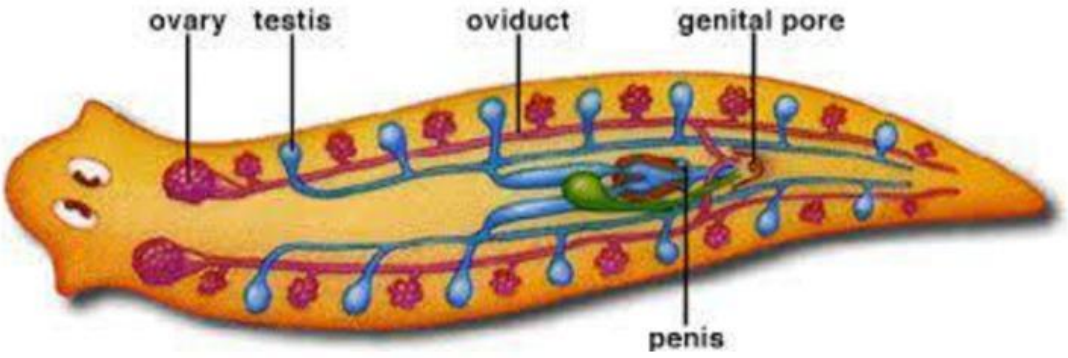
- Excretion and osmoregulation – controlled by ciliated flame cells located in protonephridia

Phylum Platyhelminthes

Learning outcomes: Describe the unique characteristics of Platyhelminthes

Characteristics of Platyhelminthes

- Reproduction: **asexual and sexual**
- Most are **hermaphrodite**: both female and male reproductive organs present in adult worms



Phylum Platyhelminthes

Learning outcomes: State the classification of Platyhelminthes into four classes

Classification of Platyhelminthes

- Divided into 4 classes
  1) Class Cestoda – example; *Taenia sp.* (tapeworm)
  2) Class Trematoda – example; *Fasciola sp*. (flukes)
  3) Class Turbellaria – example; *Planaria sp.* (free-living)
  4) Class Monogenea – example; *Dactylogyrus sp*. (flukes)

- **Fluke (non-segmented)** and **tapeworm (segmented)** are parasitic, while class Turbellaria is free living

Turbellaria (free-living)

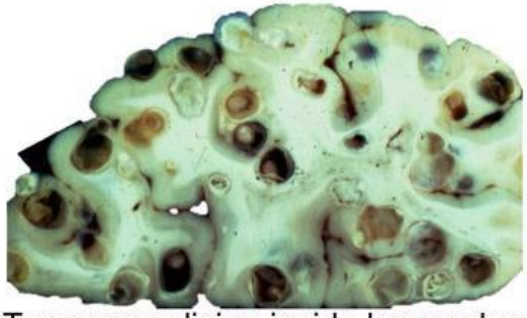
Cestoda (tapeworms, parasites)

Trematoda (flukes, parasites)

Phylum Platyhelminthes

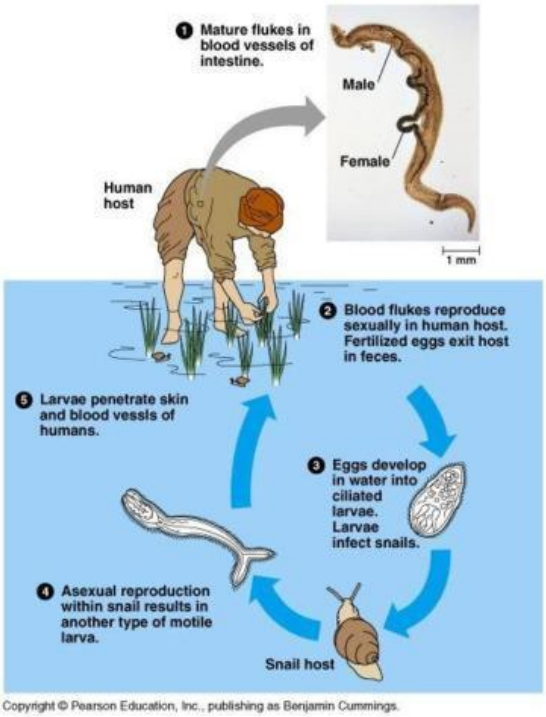
Platyhelminthes as parasites

- Cestodes and flukes causes important disease in humans and livestock
- **Schistosomiasis** (snail fever) – an important platyhelminth disease causing suffering and some deaths in tropical countries.



Tapeworms living inside human brain

- **Neurocysticercosis** – larvae of pork tapeworm penetrate the central nervous system, a major cause of acquired epilepsy worldwide

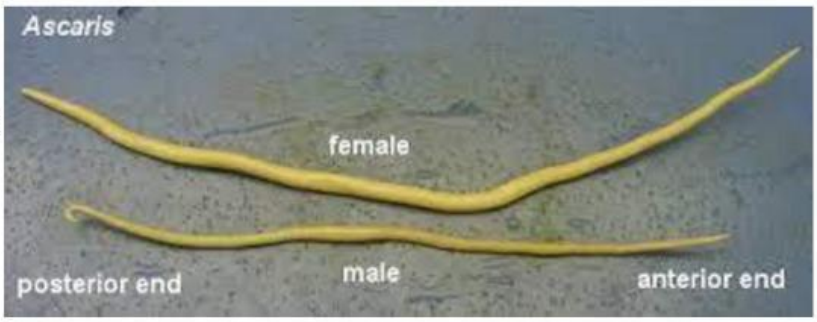


Phylum Nematoda

Learning outcomes: Describe the unique characteristics of Nematodes

Characteristics of Nematodes

- Known as **roundworms**, many are parasitic
- **Bilaterally symmetrical, unsegmented** worms
- Body elongated, cylindrical and tapered at both ends
  - Covered with tough flexible cuticles, give protection and body shapes – molts as the worm grows
- E.g.: *Ascaris sp.*
- Most are **dioecious** (separate sexes)



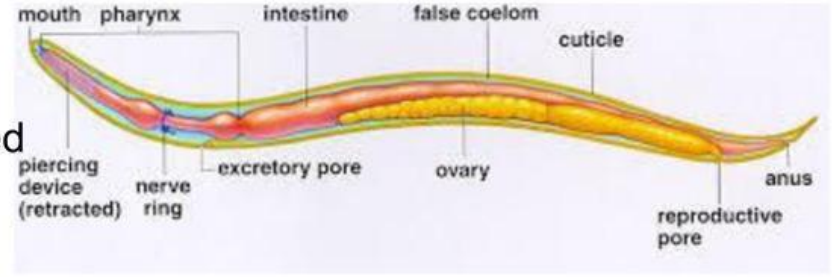
Phylum Nematoda

Learning outcomes: Describe the unique characteristics of Nematodes

Characteristics of Nematodes

- **Complete digestive system** with a mouth and anus

- Do **not possess organs for circulation/excretion**. Diffused gas can dissolve directly through the body wall.



- **Triploblastic, pseudocoelomate**
  - Have **body cavity but incompletely lined with mesoderm**
  - **Internal organs** (intestine and reproductive organs) are suspended within the fluid-filled **pseudocoelom**
  - **Fluid-filled pseudocoelom** – as hydrostatic skeleton and transport nutrient

Phylum Nematoda

Learning outcomes: Describe the unique characteristics of Nematodes

Characteristics of Nematodes

- *Brugia malayi* – roundworm nematode which causes lymphatic filariasis or elephantiasis
  - *B. malayi* is transmitted by mosquitoes that is restricted to Southeast Asia
  - Adult worms reside in lymphatic vessels – caus blockage. Lymphatic fluid cannot flow through and the vessels and causing limbs to swell.

Bruga malayi

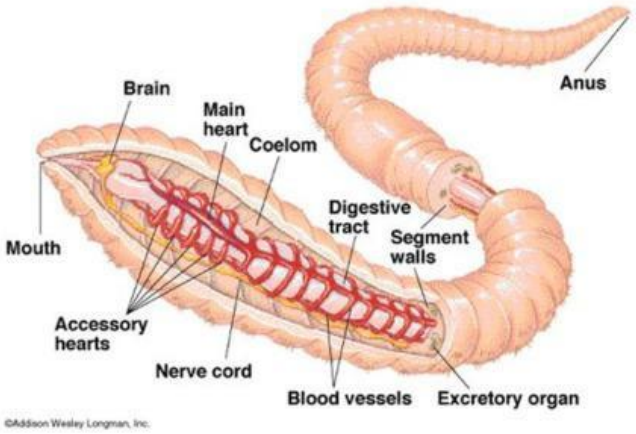
A person infected by *Brugia malayi*

Phylum Annelida

Learning outcomes: Describe the unique characteristics of Annelida

Characteristics of Annelida

- Annelids – **earthworms, polychaetae** worms and **leeches**
- **Segmented** body both externally and internally
  - Separated internally by septa, externally by annuli
  - Segments contain the same sets of organs
- **Segmentation = metamerism**. The advantages are:
  - Can control movements by separate segments independently

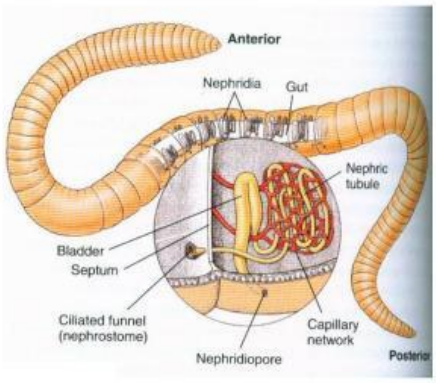


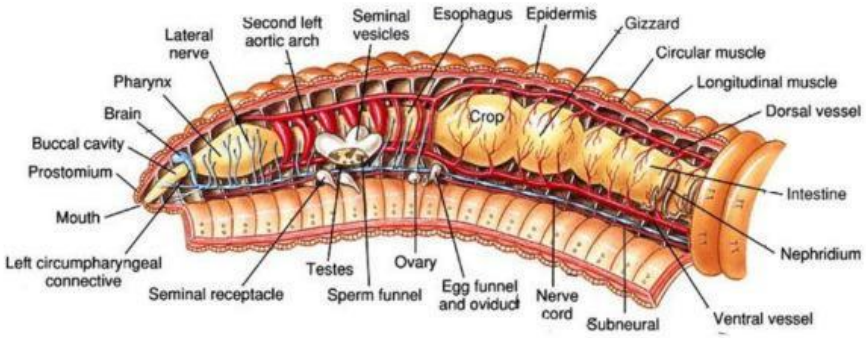
Phylum Annelida

Learning outcomes: Describe the unique characteristics of Annelida

Characteristics of Annelida

- Body wall – made up of circular and longitudinal muscles
  - Body covered by pliant cuticle which may have chitinous hair-like structure called setae/chaeta (except for leaches)
- **Triploblastic, bilateral symmetry** and **well-developed coelom**, organs are well developed.
- **Monoecius** or **dioecious**
- Excretory system - through nephridia





Phylum Annelida

Learning outcomes: State the classification of Annelida into 3 classes

Classification of Annelida

- Divided into 3 classes
  1) Class Oligochaeta; e.g.: *Pheretima* (Earthworm)
  2) Class Polychaeta; e.g.: *Nereis* (Rag worm)
  3) Class Hirudinea; e.g.: *Hirudo* (Leech)

Pheretima sp.

Nereis sp.

Hirudo sp.

Phylum Annelida

Roles of Annelida

- Earthworms – important in the construction and fertility **maintenance of the soil**

  - Earthworm bringing nutrients up to the surface layer of the soil and assisting in the breakdown of organic matter in or on the surface of the soil

  - As they move – earthworms aerate the soil and enrich it with nitrogenous waste

  - Burrowing action – allow air to penetrate the soil and provide channel for water to drain and enter.

Fill up the table below

Phylum	Platyhelminthes	Nematoda	Annelida
Level of organization		Triploblastic; pseudocoelomate	
Segmentation	unsegmented		
Body shape			
Digestive system			Complete with mouth and anus
Reproductive system			
Presence of chaetae			