

### Acoelomate taxa

Flatworms (Phylum Platyhelminthes)

Ribbon worms (Phylum Nemertea)

- First appearance of bilateral symmetry
- Still no coelom, just gut cavity
- Do have 3 well defined germ layers (ectoderm, endoderm, mesoderm)

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### Acoelomate taxa

- Space between gut and ectoderm filled with mesodermal parenchyma
- Mesoderm allows for more complex organization
- System level of organization (still simple)
- Evolution of cephalization
- Advances in nervous coordination and appearance of excretory system

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### Flatworm Form and Function

#### Phylum Platyhelminthes

##### General traits

- > Large range in size
- > Body flattened dorsoventrally
- > Both free-living and parasitic forms

See Figs. 8.1 and 8.4 in text

##### Free-living

- > Some freshwater and terrestrial, most marine

##### Parasitic

- > Both endo and ectoparasites
- > Often multiple hosts (some in humans)

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**Flatworm Form and Function**  
**Phylum Platyhelminthes**

**Locomotion**

- > Epidermis has cilia
- > Dual gland organs for anchoring and release
- > Multiple layers of muscle fibers

See Fig. 8.5 in text

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**Flatworm Form and Function**  
**Phylum Platyhelminthes**

**Locomotion**

- > Epidermis has cilia
- > Dual gland organs for anchoring and release
- > Multiple layers of muscle fibers

**Nutrition and Digestion**

- > Have mouth, pharynx and intestine (usually branched)
- > Free-living members are carnivorous
- > Both extracellular and intracellular digestion

See Fig. 8.7 in text

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**Flatworm Form and Function**  
**Phylum Platyhelminthes**

**Excretory system**

- Organs called protonephridia
- Flame cells with tuft of flagella
- Beating flagella creates negative osmotic pressure
- Fluid passes out through ducts and excretory pores

See Fig. 8.7 in text

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## Flatworm Form and Function

### Phylum Platyhelminthes

#### Nervous system and sense organs

- Longitudinal nerve cords
- Connecting nerves in ladder pattern
- Differentiation of neurons
- Ocelli, ear-like organs, chemical & mechanical receptors

See Fig. 8.7 in text

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## Flatworm Form and Function

### Phylum Platyhelminthes

#### Reproduction

- ❖ Both asexual and sexual
- ❖ Asexual by fission or budding
- ❖ Nearly all monoecious and hermaphroditic
- ❖ Complex reproductive organs
- ❖ Some require host for hatching

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## Flatworm Taxonomy

Four classes of Phylum Platyhelminthes

### 1. Turbellaria

- Mostly free-living
- Muscles and cilia for movement
- Some gliding over mucous from adhesive glands
- Form of gut or pharynx used to classify Orders

See Fig. 8.8 in text

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## Flatworm Taxonomy

Four classes of Phylum Platyhelminthes

### 2. Trematoda

- All parasitic flukes
- Endoparasitic in vertebrates
- No cilia on epidermis
- Suckers and hooks for adhesion, sense organs minimal

#### Subclass Digenea

- Intermediate host (mollusc) and Definitive host (vertebrate)
- One hatched egg can generate many progeny
- Important parasites of humans and domestic animals
- Liver flukes, blood flukes, lung flukes

See Fig. 8.9 in text

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## Flatworm Taxonomy

Four classes of Phylum Platyhelminthes

### 3. Monogenea

- Ectoparasites, mainly of fish
- Attach to gills and feed on body fluids (blood)
- Only damaging in crowded conditions
- Single host (direct life cycle)

See Fig. 8.12 in text

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## Flatworm Taxonomy

Four classes of Phylum Platyhelminthes

### 4. Cestoda

- Tapeworms
- Sets of reproductive organs (proglottids)
- Microvilli expand surface area for absorption (no digestive system)
- Suckers and hooks present

See Figs. 8.13 and 8.15 in text

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**Cestoda**

➤ Two hosts (indirect life cycle)

➤ Digestive tract of vertebrates is final host

➤ Many infect humans – beef, pork, fish, and dog tapeworms

See Fig. 8.16 in text

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**Other Acoelomate Phyla**

**Phylum Nemertea**

- Ribbon worms
- Nearly all free-living and marine
- Eversible proboscis in cavity called rhynchocoel
- Complete digestive system with anus

See Figs. 8.18 - 8.20 in text

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**Pseudocoelomate taxa**

**Several phyla**

Refer back to Fig. 3.9 in text

**Tube-within-a-tube body plan**

**Pseudocoel (non-Mesodermal)**

which promotes:

- Freedom of movement
- System development
- Storage and distribution of materials
- Hydrostatic skeleton

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## Phylum Nematoda

- Very abundant, 15,000 species
- Found in all habitats (some extreme)
- Many free living, most parasitic
- \$100 billion in crop damage each year from plant parasites
- Impact almost all vertebrates, including humans

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## Phylum Nematoda

- Most are small, some microscopic
- Syncytial epidermis covered by thick cuticle
- Hydrostatic pressure high in the pseudocoel (cuticle important for support)
- Only longitudinal muscles, capable of side-to-side motion
- Suction feeding

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## Parasitic Nematodes of Humans

### Hookworm

- Burrow directly into skin

### Pinworm

- Inhale eggs in dust or by fingers, most common

### Intestinal roundworm

- Ingest eggs in contaminated food (vegetables)
- Can reach 30cm and cause intestinal blockage

### Trichina worm

- Ingest juveniles in pork

### Whipworm

- Ingest in contaminated food

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