Acanthocephala: External

d. External covering
1. extremely complex system of canals and musculature.
2. Layers in integument:
   a. lots of surface area
   b. Multiple mitochondria - seems associated with combined osmoregulatory and excretory function.

Acanthocephala

b. Canals are called lacunae
1. Anterior part involves the lemnisci.
2. Posterior is the lacunar system.
3. Each section seems separate.

Acanthocephala: Reproduction

1. Sexes are separate
   a. Males
   1. Suspended testes
   2. Cement glands
   3. Copulatory bursa
Acanthocephala: Reproduction

1. Saefftigen's pouch - permits penis to evert.

2. Females
   a. Ovarian balls - free floating uterine tissue within ligamental sac.
   b. Fertilization occurs within the sac.
   c. Embryos circulate and are later sorted by the uterine bell.
**Acanthocephala: Life cycle**

a. Involves intermediate hosts - usually arthropod.

b. Eggs fertilized in female, early development there.

3. Uterine bell sorts out mature acanthor larvae

4. Larvae shed in feces of host, ingested by intermediate host.

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**Acanthocephala: Life Cycle**

5. Acanthor hatches, to acanthella that burrows through intestinal lining.

6. May go through several acanthella stages.

7. Encysts as cystacanth - awaits transmission to final host.

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**Acanthocephala: Life Cycle**

8. Often modification of intermediate host behavior.

9. Adult hatches out in definitive host's gut.
Acanthocephala: Characteristics

Examples:
a. *Macracanthorhynchus*.

![Eggs in pig feces](image)

*Macracanthorhynchus hirudinaceus*

![Diagram of *Macracanthorhynchus hirudinaceus* life cycle](image)

*Macracanthorhynchus hirudinaceus*
Acanthocephala: Examples

b. Plagiorhynchus - Janice Moore, CSU

1. infected isopods walk on sidewalks, increase transmission to starling chicks.

Acanthocephala: Characteristics

c. An Undescribed species in Montezuma Well.

1. Turns amphipods orange
2. May enhance transmission to final avian host (ducks).
Acanthocephala: Sexual Dimorphism

1. Separate sexes, males < females
2. Males compete with each other for access to mates.
   a. Competition includes cementing other males up
   b. May favor early maturation - mature 1st, be cements.
Acanthocephala: Sexual Dimorphism

3. females produce many eggs - dispersed in feces to be picked up by intermediate hosts
   a. larger females produce more eggs
   b. may favor longer period of growth, larger size at maturity.

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Acanthocephala: Sexual Dimorphism

4. Thus, sexual dimorphism appears to be a consequence of two factors:
   1. Selection favoring rapid maturation in males.
   2. Selection favoring large size in females.

b. Result: large females, small males.

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Phylum Nematomorpha

General Characteristics
1. Wierd, once thought to represent spontaneous generation.
   a. Adults occur in horse troughs.
   b. Attempts to revitalize horsehairs failed.
**Phylum Nematomorpha**

General Characteristics

2. Fairly abundant - 230 spp

3. Body form
   a. Similar to nematodes
   1. thick cuticle must be molted.

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**Nematomorpha: Characteristics**

2. Longitudinal muscles.
3. No ciliated structures.

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**Nematomorpha: Characteristics**

Dissimilar to Nematodes.

1. Do not show consistency in cell number (eutely).
2. Pseudocoel filled with mesenchyme.
3. Rudimentary digestive system.
Phylum Nematomorpha
Dissimilar to Nematodes.

1. Nutrients absorbed from body of insect host.
2. No excretory system
3. No specialized genital system - cloacas in both sexes.

Nematomorpha: Reproductive Anatomy
1. Undifferentiated anterior end.
2. Female (left)
3. Male (right); note clasping alae.
Phylum
Nematomorpha

Historical Notes:

a. Example: *Gordius* after the Gordian Knot.
   1. intricate knot tied by King Gordius of Phrygia
      a. whoever untied it would be King of Asia.

b. Alexander cut it with his sword and became King of Phrygia
Nematomorpha: Life Cycle

a. Adults develop in bodies of insects.
1. Cause hosts to seek water, once entering, they explode.
2. Separate sexes mate in water.

Nematomorpha: Life Cycle

a. Females lay eggs that wrap around aquatic vegetation.
3. Eggs hatch, larvae remain free living for only a few days.
Nematomorpha: Life Cycle

4. Larvae ingested by host when insects feed or drink near water.
   a. Use hooked proboscis to imbed in tissues

b. If unsuitable host ingests, will encyst and wait for intermediate host to be ingested by suitable host.
   1. Beetle → mantid

Nematomorpha: Other Hosts

2. Can also inhabit annelids, molluscs, crustaceans, humans
5. Mature worm develops beneath skin.

Horsehair (Gordian) Worm