LECTURE (5)

Tongue Worms (Pentastomida)

… Pentastomida or Linguatulida (tongue worms) represent a separate group in the animal kingdom showing certain morphological convergences with some other phyla.

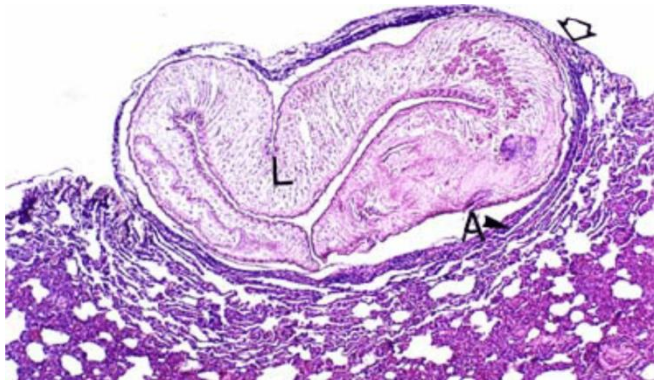
… Some approaches were done to assign them to the cestodes, nematodes, acanthocephalans, hirudineans, crustaceans or arachnids.

… Recently, the body is divided into the anterior cephalothorax and an abdomen and therefore placed close to crustaceans.

The fine structure of the cuticle indicates a close relationship to the arthropods but differs from that of nematodes due to integration of higher amounts of chitin.

System
Phylum: Pentastomida (extract)
Order: Cephalobaenida
Family: Cephalobaenidae
Genus: *Cephalobaena*
Genus: *Raillietella*
Family: Reighardiidae
Genus: *Reighardia*
Order: Porocephalida
Family: Sebekidae
Genus: *Sebekia*
Family: Subtriquetridae
Genus: *Subtriquetra*
Family: Sambonidae
Genus: *Sambonia*
Genus: *Waddycephalus*
Family: Diesingidae
Genus: *Diesingia*
Family: Porocephalidae
Genus: *Porocephalus*
Genus: *Kiricephalus*
Family: Armilliferidae
Genus: *Armillifer*
Genus: *Cubirea*
Family: Linguatulidae
Genus: *Linguatula*

Linguatula serrata (Tongue Worms, Linguatulosis)



… It is a cosmopolitan zoonotic parasite.
… The worms are whitish and tongue shaped and appear annulated.
… It is wormlike parasites of the respiratory systems of vertebrates.
… It live in the nasopharyngeal region of mammals (intermediate host).
… Their anterior end is wider than the posterior one and possesses four oral hooks.

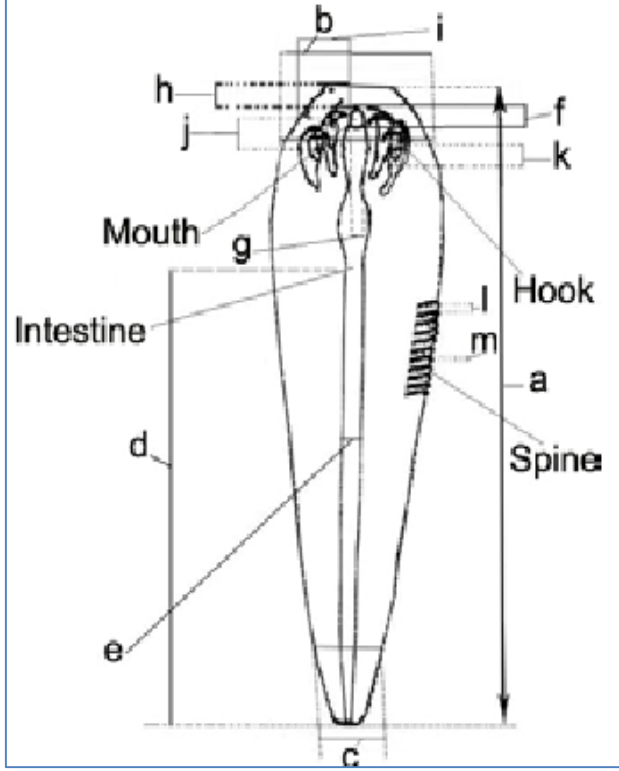
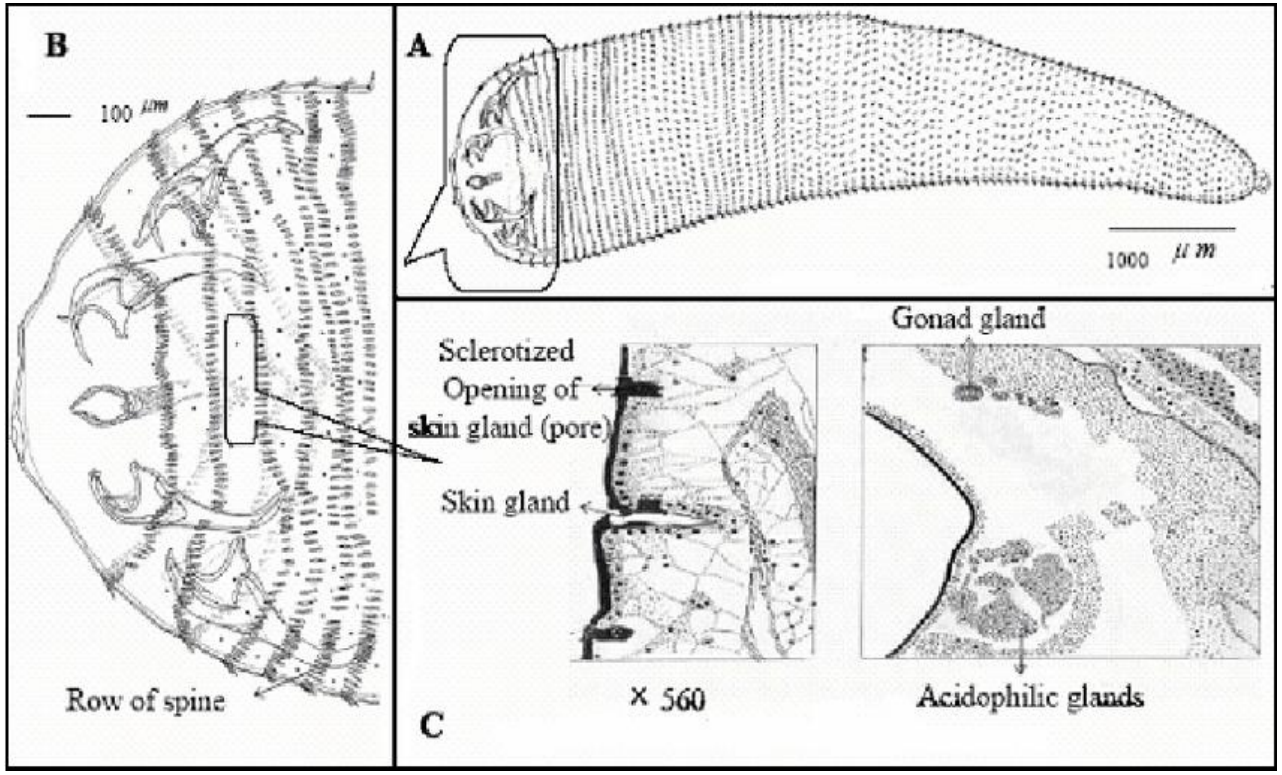


Fig. 4. *L. serrata* nymph;
a. body length
b. body width at apex
c. body width at base
d. intestine length
e. intestine width
f. mouth length
g. mouth width
h. distance of mouth from apex
i. distance of mouth from margin
j. hook width
k. hook diameter
l. inter segment space
m. spine length



… The adults live in the nasal cavities but also in the respiratory tract.

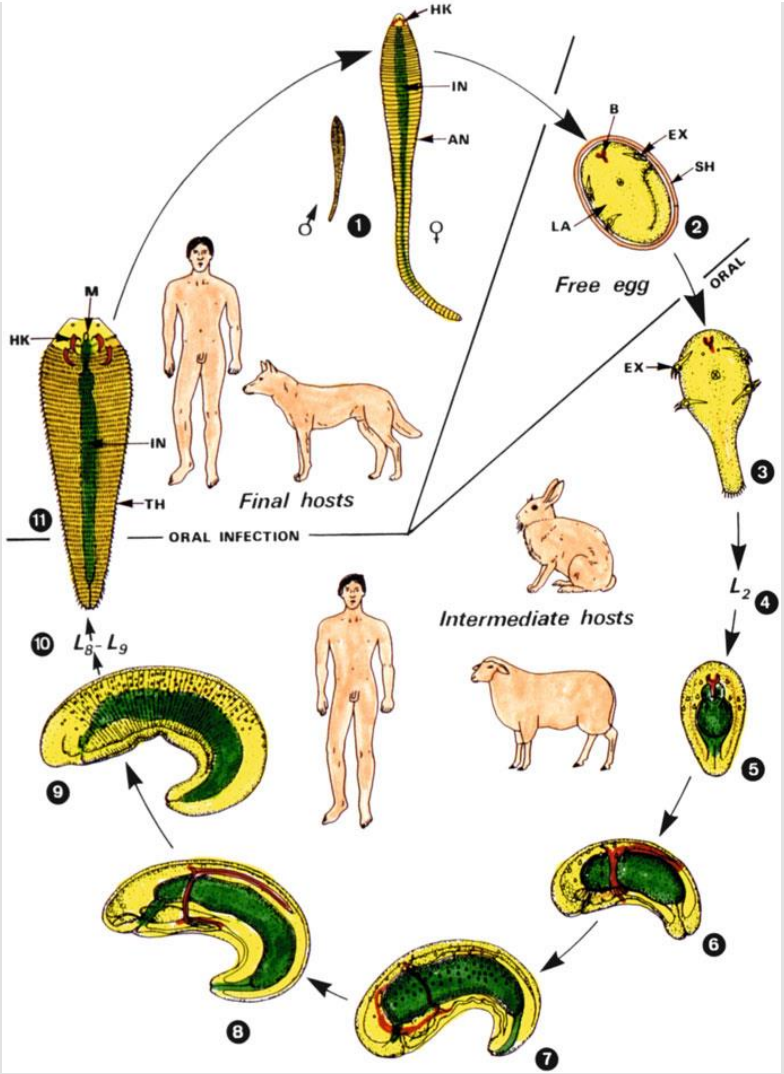
Their either embryonated or larva-containing eggs reach the outside within nasal discharge or with the feces after being swallowed.

… If the eggs are ingested orally by herbivores, the larvae penetrate the intestinal wall and migrate into the mesenterial lymph nodes, but also into the lung, liver etc., where they reach the infectious nymph stage after a development over several months.

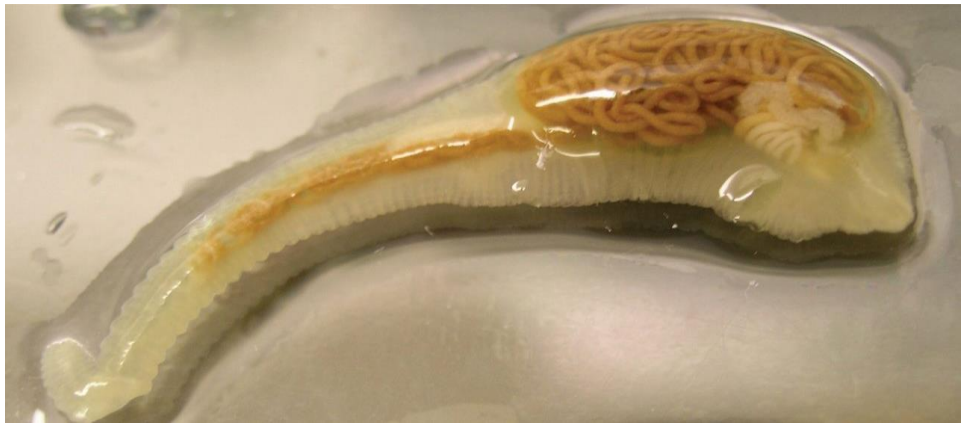
This stage is called terminal larva and is located in nodules filled with liquid, which are called pentastome nodules and which are occasionally found during meat inspection.

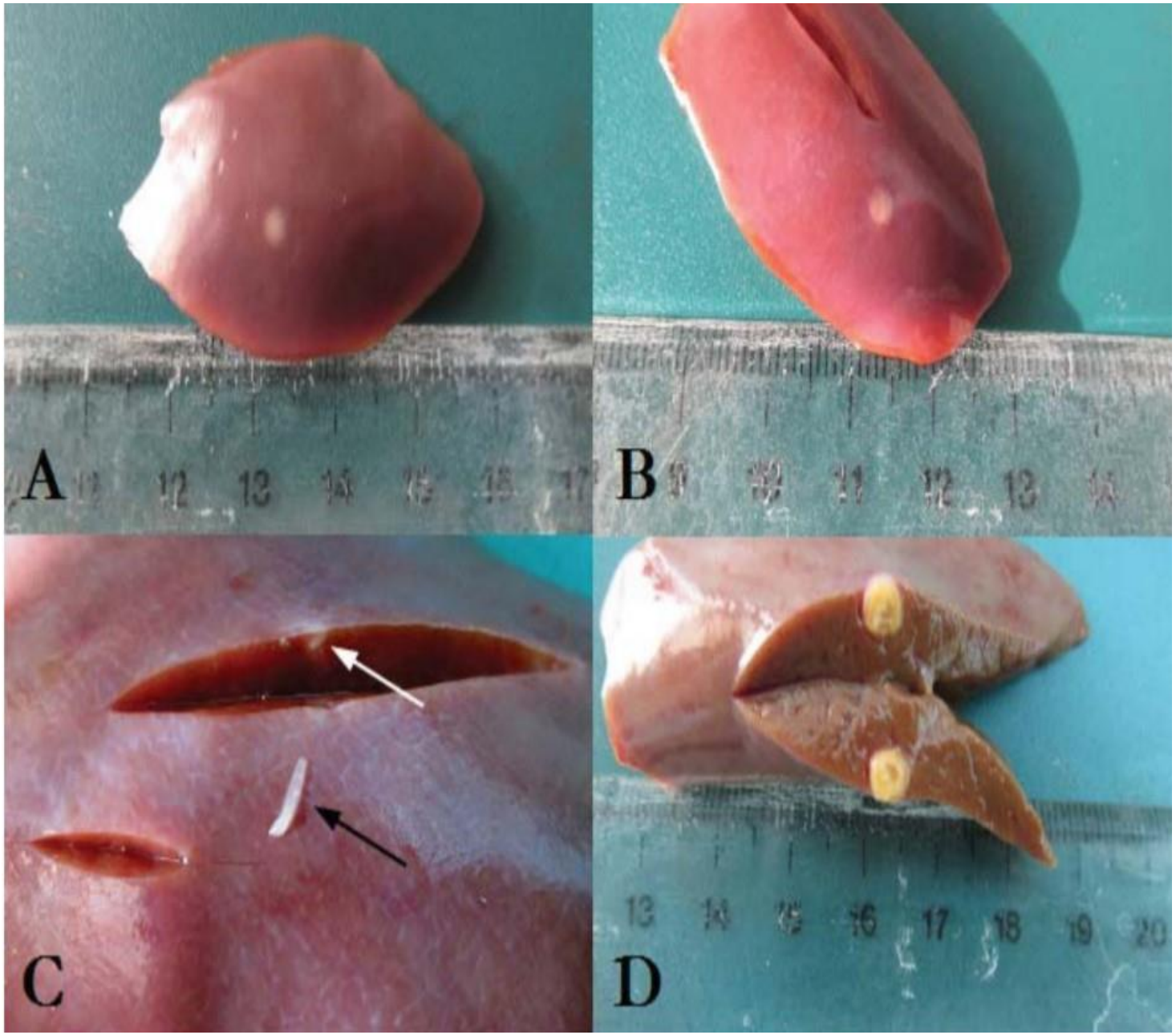
…These nodules are left after 1–3 months and the terminal larva reaches either the abdominal cavity or the outside via the oral cavity.

If a dog or another final host ingests such larvae orally either within infected visceral or as "free" larvae from the outside, the infection of the nasal cavity occurs. The adult stage is reached after another moult.



Diagrammatic representation of the developmental cycle of *Linguatula serrata*. 1 Adults (♀, ♂) live in the nose of dogs and (in rare occasions) in humans. 2 Embryonated (free) eggs are released with nasal discharge. 3–11 If intermediate hosts ingest such larvacontaining eggs (=oral infection), the larva hatches in the intestine and migrates via blood vessels to internal organs, where it grows up via several moults. In case final hosts ingest such larvae (11) with raw or undercooked meat, the larvae migrate to the nose and reach sexual maturity. AN=annulus; B=drilling organ; EX=extremity with a claw; HK=mouth hooks; IN=intestine; LA=1st larva; M=mouth; SH=inner shell; H=thorn




A
B
C
D

Symptoms of disease:
Nose catarrh, sneezing, itching, bacterial secondary infection and reduction/loss of olfaction.

Diagnosis:
Detection of typical eggs in nasal discharge or in feces; evidence of adult worms which were spontaneously released when sneezing.

Course of infection:
Orally by uptake of infectious larvae with infected visceral or nasally by sniffling at free larvae. Humans can often act as intermediate hosts. *Infection occurs either by*:
– Oral uptake of eggs with drinking water,
– Oral uptake of eggs with food, etc.,
– Accidental uptake of eggs during taxidermy of snakes.

Incubation period: Few weeks.

Patency: 2–3 years.

Therapy:
Mechanical removal, eventually provocation of a strong sneezing spell. Chemotherapy: Vermol® (Fa. Alpha-Biocare, Neuss).

Subkingdom Metazoa
Branch Eumetazoa (Enterozoa)
Division Bilateria (Triploblastica)
Section Eucoelomata (Coelomata)
Group Protostomia (Mouth first & Anus second)
Phylum Annelida (Ring or segmented worms)

General characters of annelids

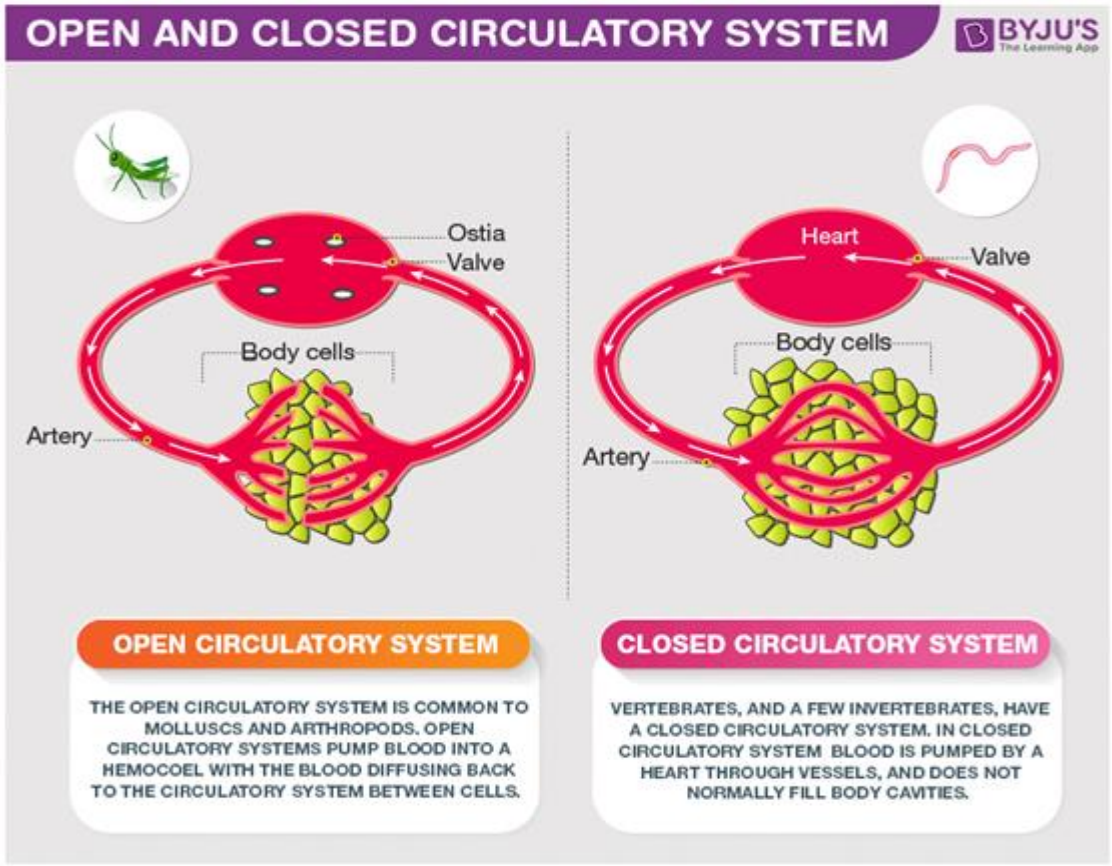
1- Body elongate and clearly segmented both externally and internally.

2- Appendages are minute rod-like chitinous setae.

3- Body is covered by a thin, moist cuticle.

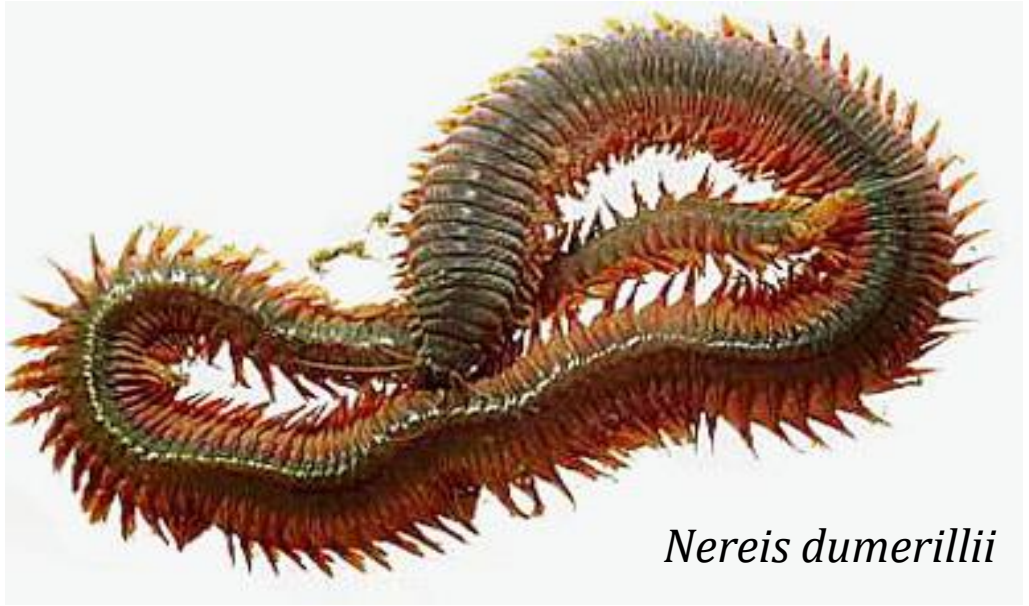
4- Circuatory system is a closed type, pseudohearts are present. Blood plasma usually contains dissolved hemoglobin and free amoebocytes.

5- Sexes may be separate and sometimes united. Some reproduce asexually by budding.



Examples of Phylum Annelida


Allolobophora caliginosa


Nereis dumerillii


Amphitrite ornata

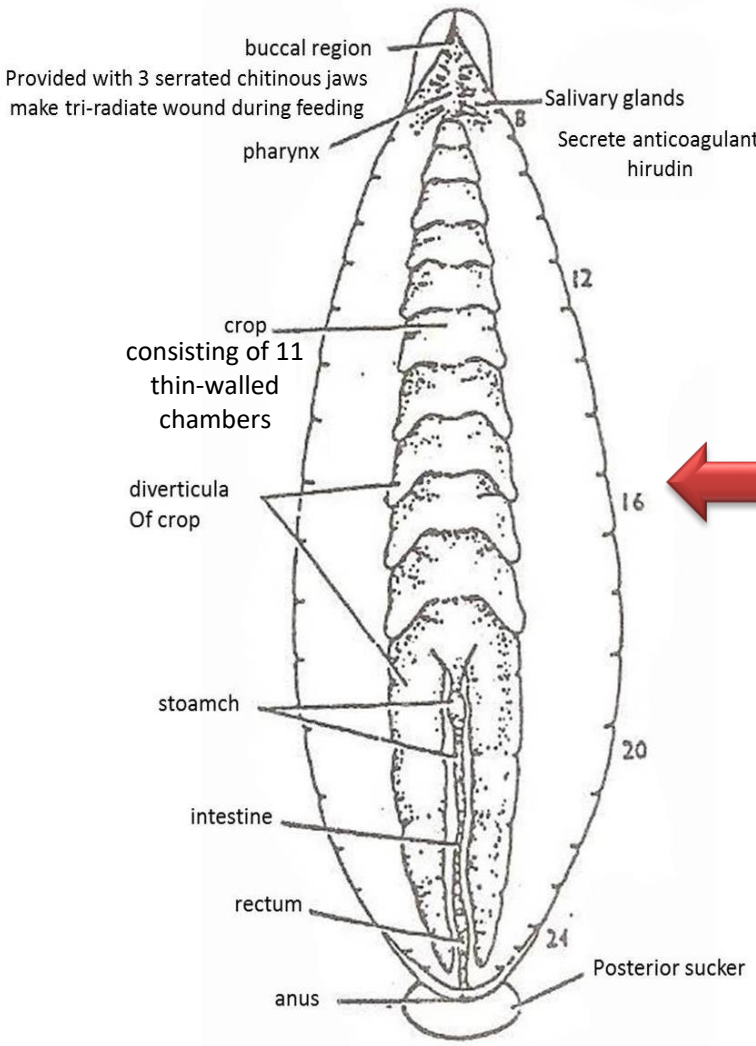

Arenicola marina

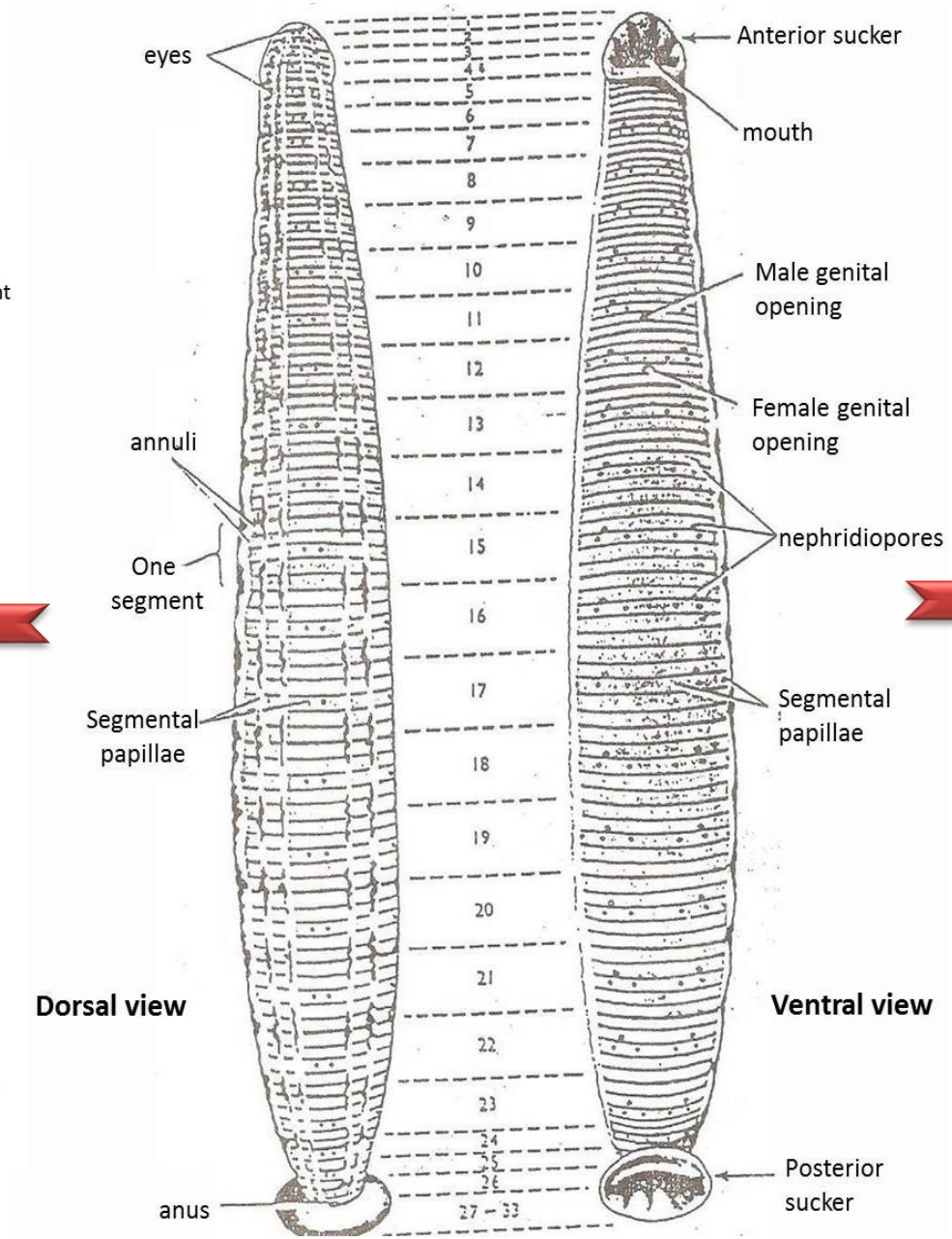

Pheretima hawayana


Hirudo medicinalis

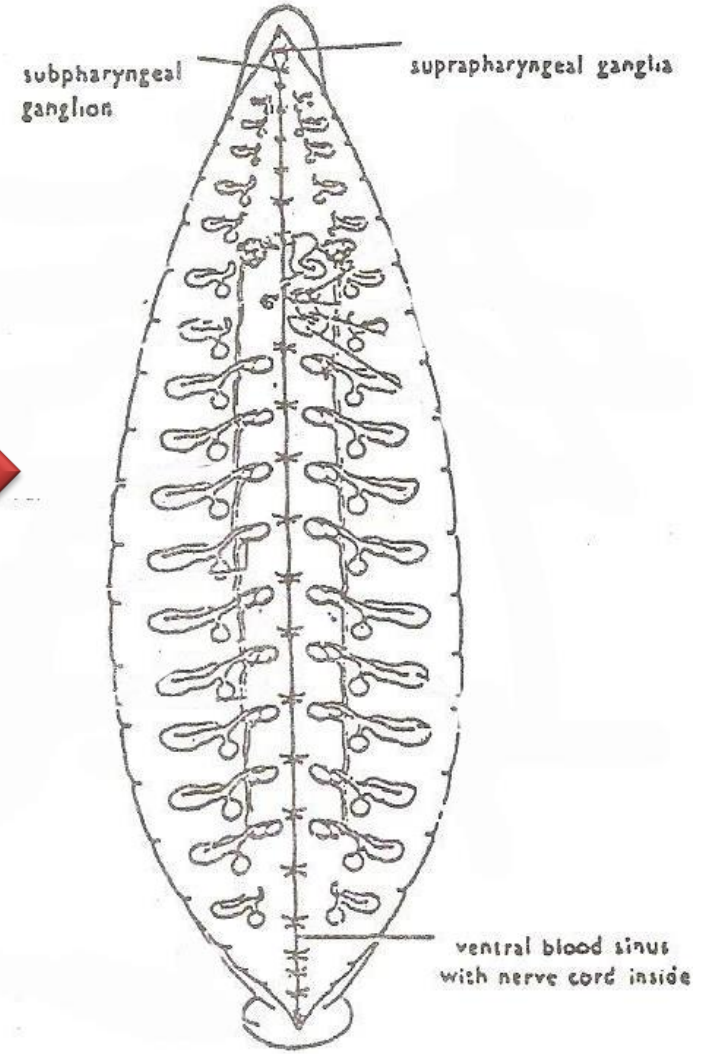
Hirudo medicinalis (Medicinal leech)

Digestive system





Nervous systems



Circulatory system of *Hirudo*

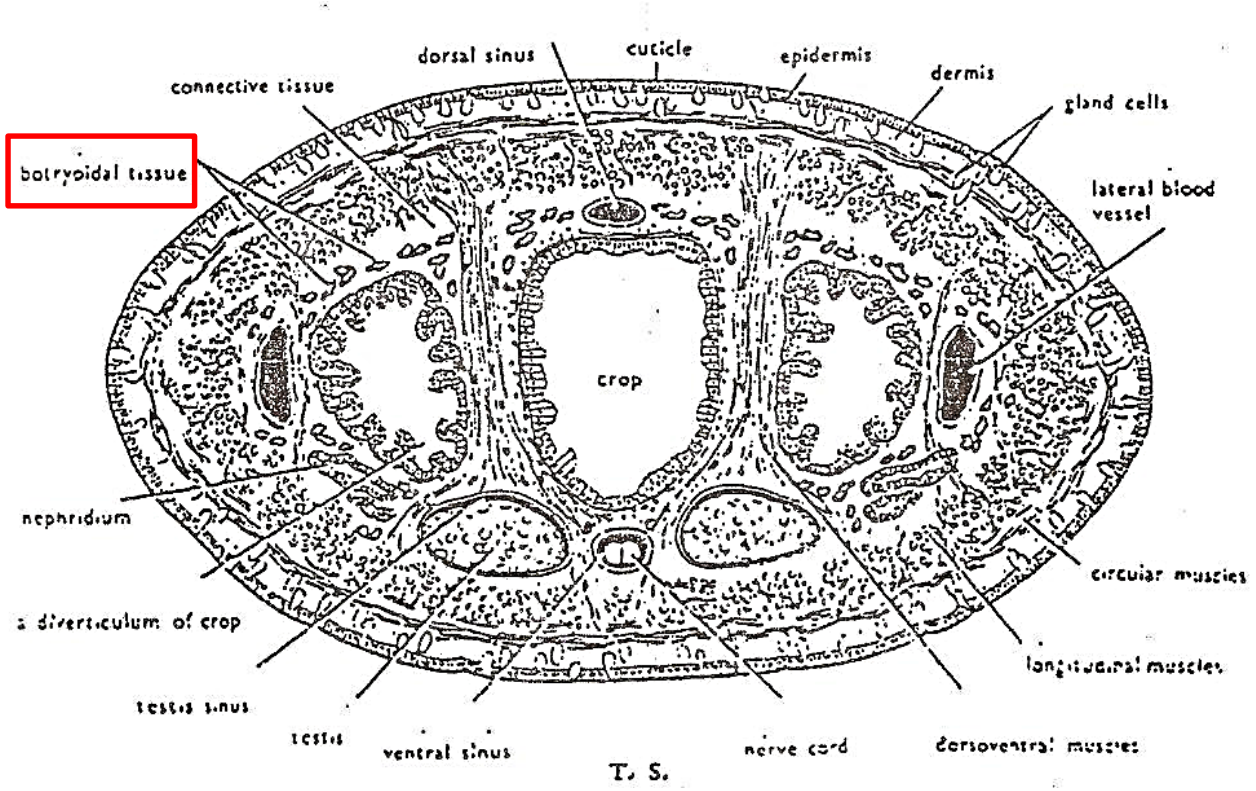
There are no true blood vessels, but only coelomic spaces which are filled with blood.

There are four longitudinal blood vessels as follows:

1- Dorsal blood vessel
2- Ventral (sub-intestinal) vessel
3- Two lateral nerve vessels

Excretory system of *Hirudo*

The excretory material is carried out of the body by a number of nephridia. In addition, close a round the gut and blood sinuses there is a peculiar spongy pigmented tissue known as the botryoidal tissue which probably of excretory function



Feeding in the medicinal leech *Hirudo medicinalis*

1- Leech clings with its suckers to the host's skin, making a triradiate wound with its jaws and sucks large amounts of blood of victim by its muscular pharynx

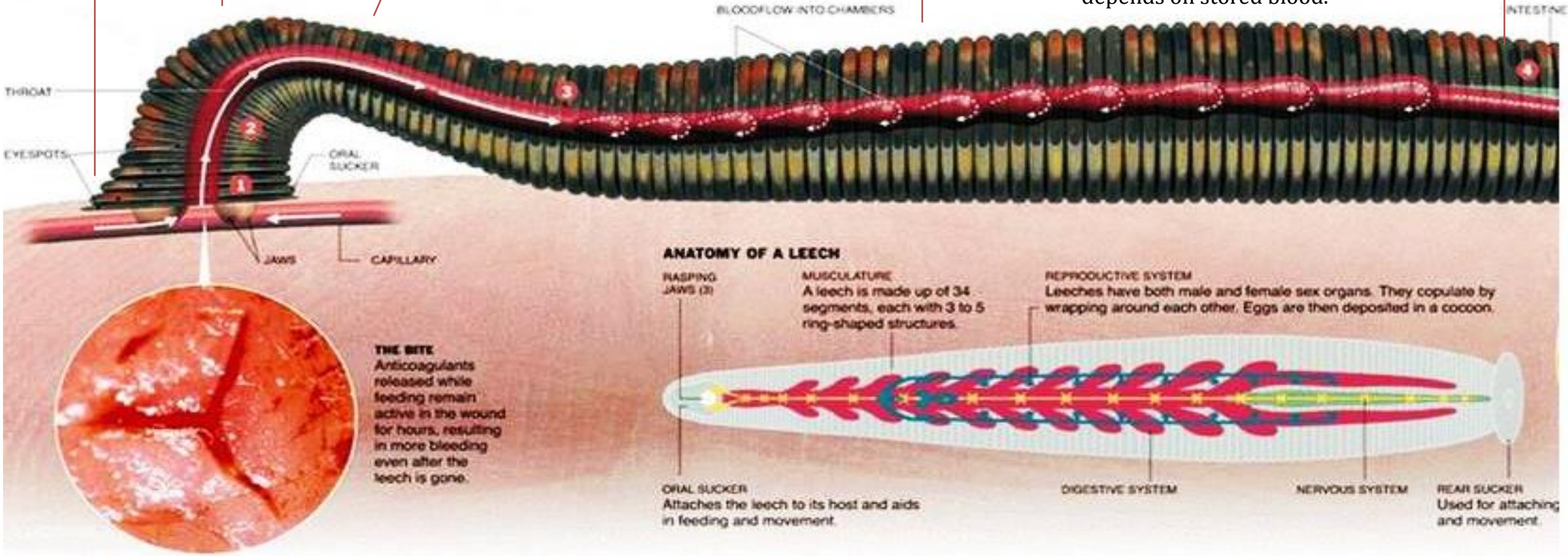
2- Leech secretes anticoagulant (Hirudin) from salivary glands to prohibit blood coagulation during feeding

3- Blood is stored in the crop and its diverticula which become extremely turgid

4- Blood sucked into chambers in the gut. Bacteria in the chambers provide additional nutrients

5- Blood is slowly moved as needed into intestine, where it is digested

6- Leech eventually drops off, seeks a shelter and remains fasting for several weeks during time it depends on stored blood.




Any
questions