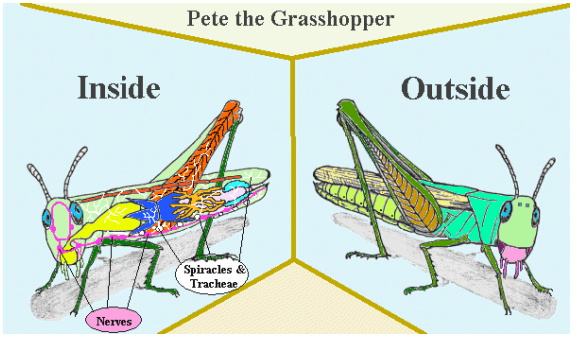
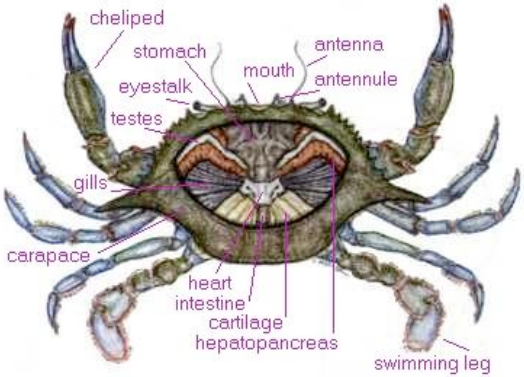
Ancestral Coelomate

Annelids

Phylum Arthropoda

- Hexapoda (insects, springtails, diplurans, and proturans)
- Crustacea (crabs, lobsters, shrimp, isopods, water fleas, brine shrimp, barnacles, etc.)
- Myriapoda
  - Pauropoda
  - Diplopoda (millipedes)
  - Chilopoda (centipedes)
  - Symphyla
- Chelicerata
  - Arachnida (spiders, mites, ticks, scorpions, etc.)
  - Merostomata (horseshoe crabs)
  - Pycnogonida
  - Trilobites †



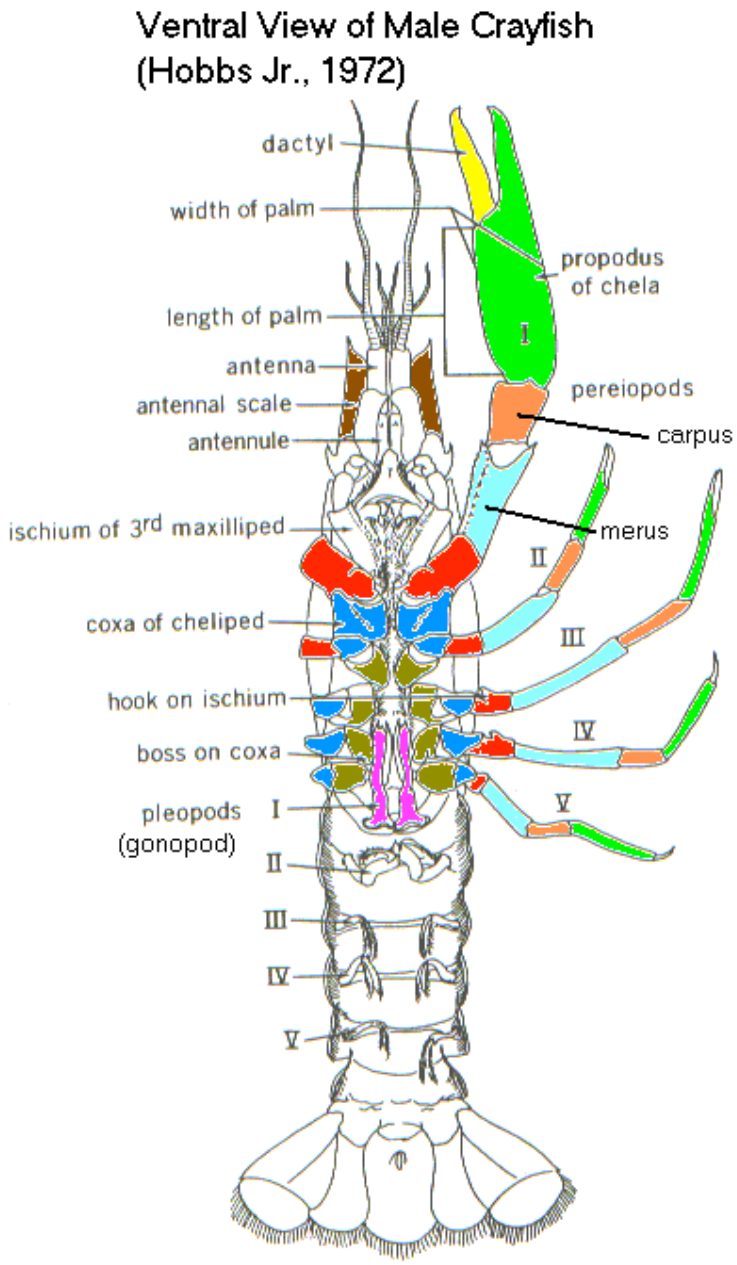


Segmented body
Jointed appendages
Exoskeleton
Protostome

Crayfish and shrimp are all in class Crustacea

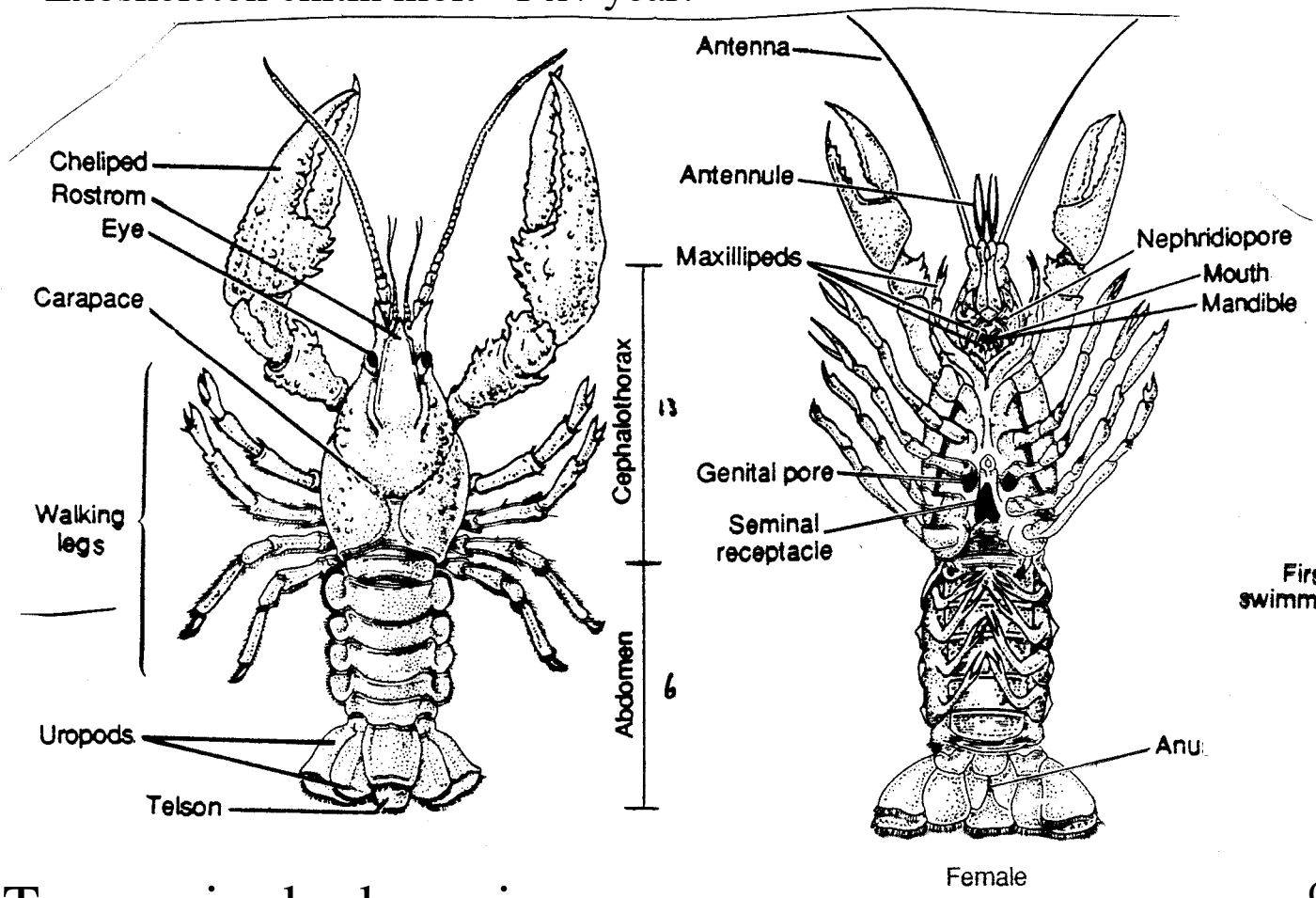
- Five pairs of thoracic appendages are legs (hence suborder name ‘decapoda’)
- Head and thorax dorsally fused

Anterior	head
Posterior	tail
Dorsal	back
Ventral	belly
Medial	middle
Lateral	sides
Proximal	near body
Distal	away from body



External anatomy

Exoskeleton chitin molt ~1 x / year.



Female

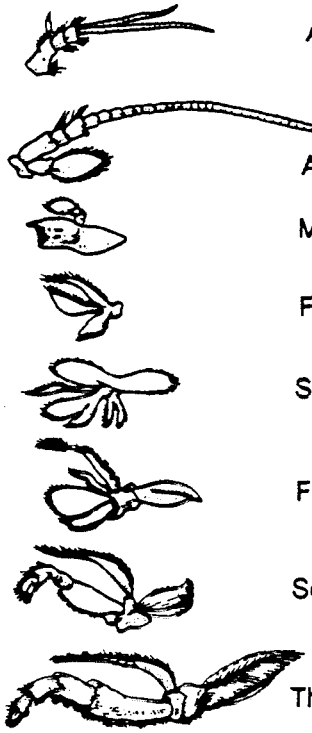
Two major body regions
Specialized appendages

Genital pores at base of 3rd pair of walking legs.
Seminal receptacle
Swimmerrets used to carry eggs

Genital pores at posterior of cephalothorax
1st pair of swimmerrets modified as sperm ducts

Appendages

Cephalothorax



sensory

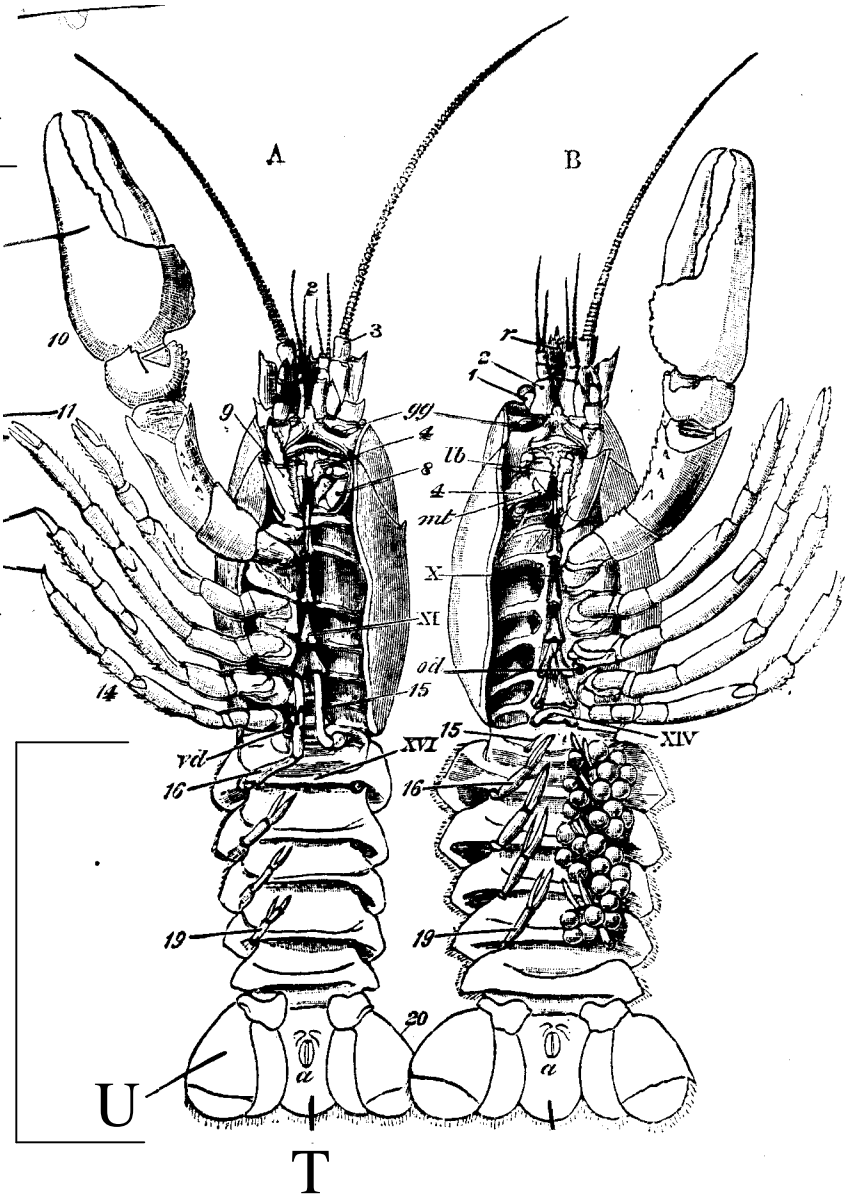
feeding

respiration

feeding

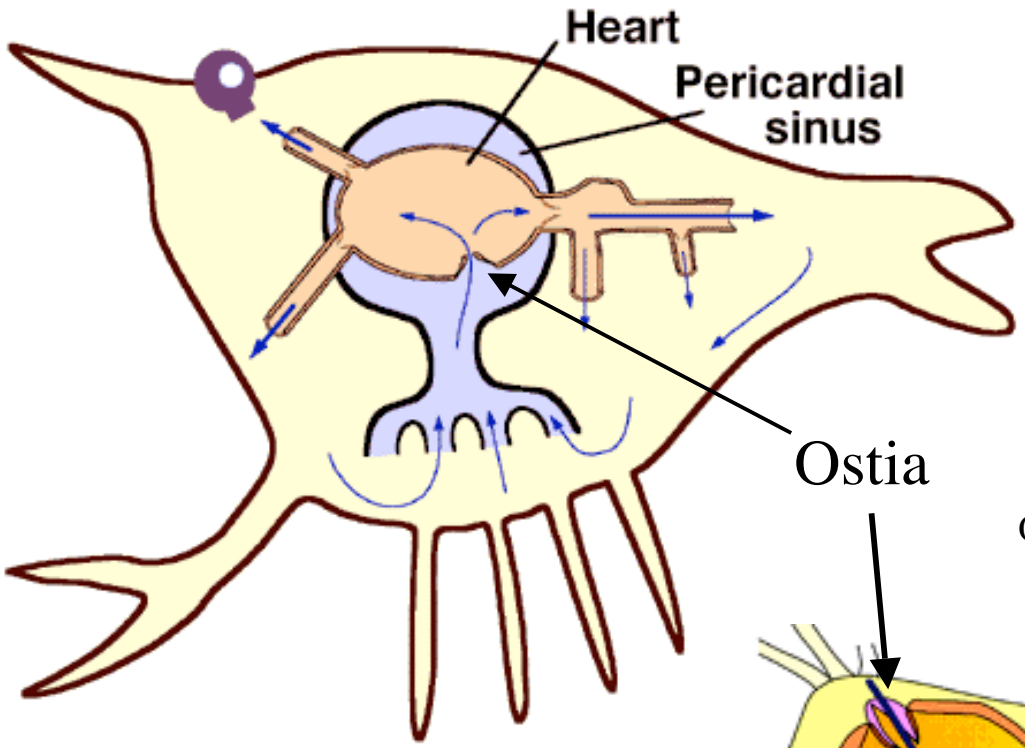
Walking legs
5 pairs

(gills)



Abdomen 6 segments
Swimmerrets-swimming + Reprod.
Uropods + telson - swimming.

Open circulatory system

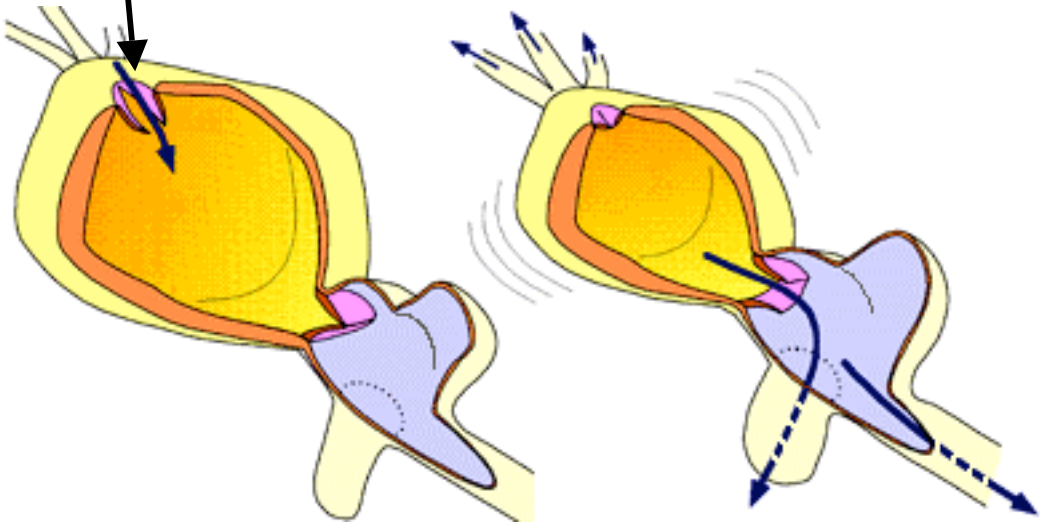


Arteries

Antennal- antennae, antennules, green glands

Ophthalmic- eyes

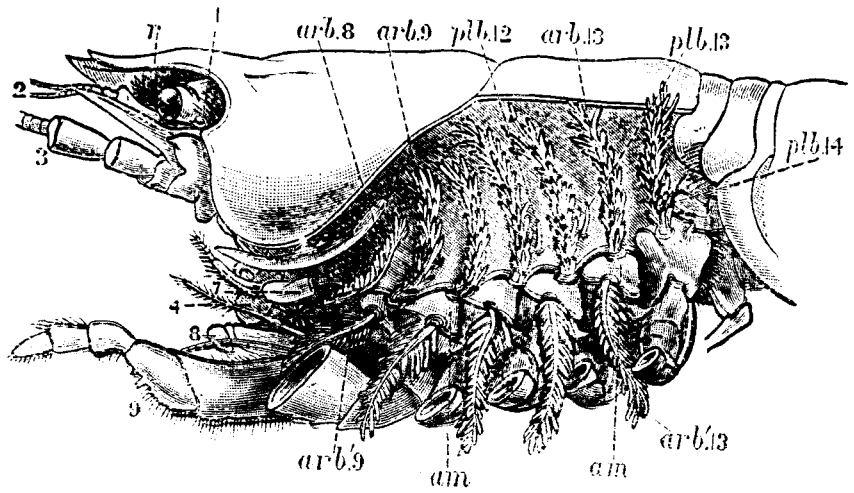
Hepatic- digestive gland



Heart → Sinuses → Heart

arteries ostia

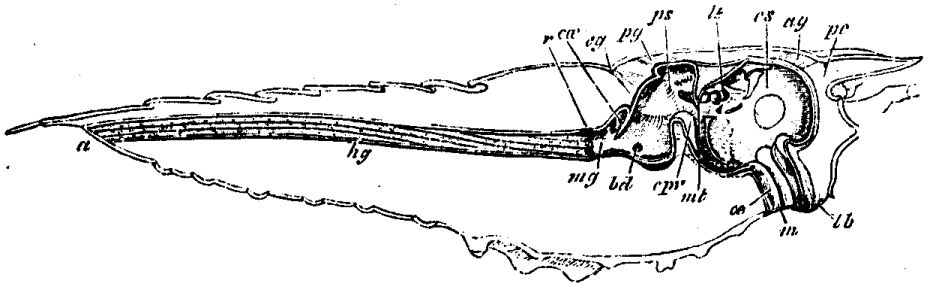
Respiratory System

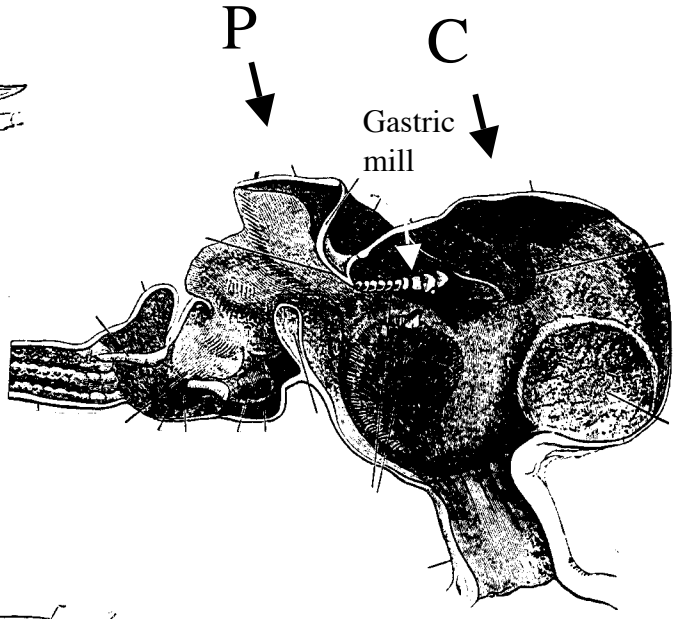


Gills under carapace

Hemolymph -blood

Digestive system





food

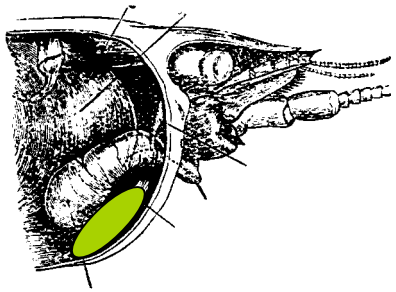
jaws

esophagus

Cardiac stomach- Storage & digestion

Pyloric stomach ← Digestive glands

Pyloric stomach → Blood absorption

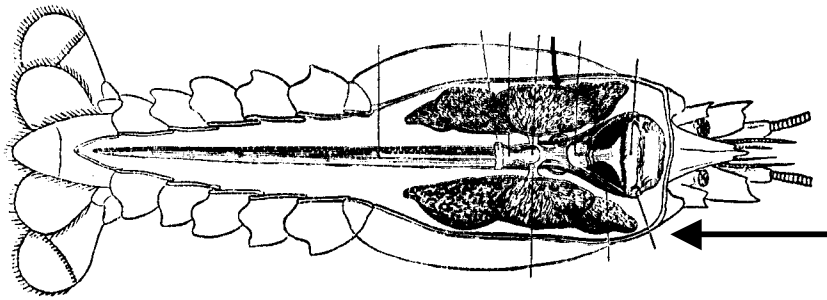


Intestine (mid, hindgut) → blood

anus

Solid wastes

blood → Green glands → nephridiopore → N-wastes



Digestive glands

Nervous system

Each segment has a ganglion

Ventral side

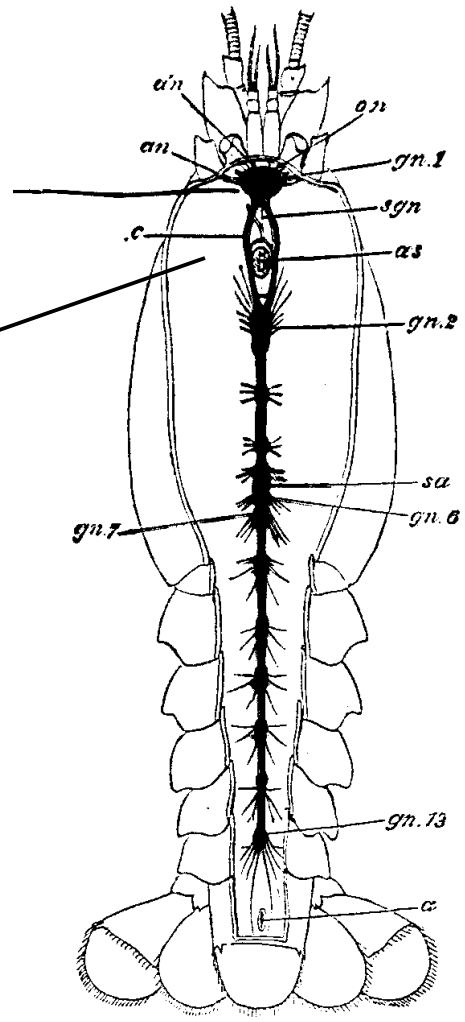
Ganglion for each segment

Cerebral ganglion

Fusion of many ganglion

Nerve chord separates to go

Around either side of esophagus



Much local control

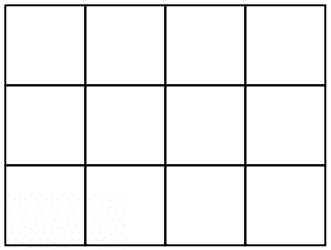
Brainless crayfish

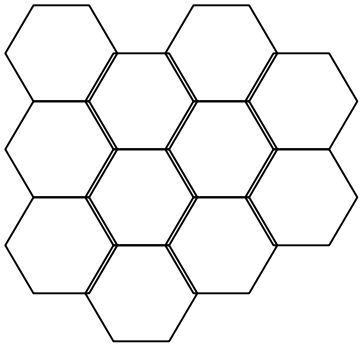
-can eat

-can't see

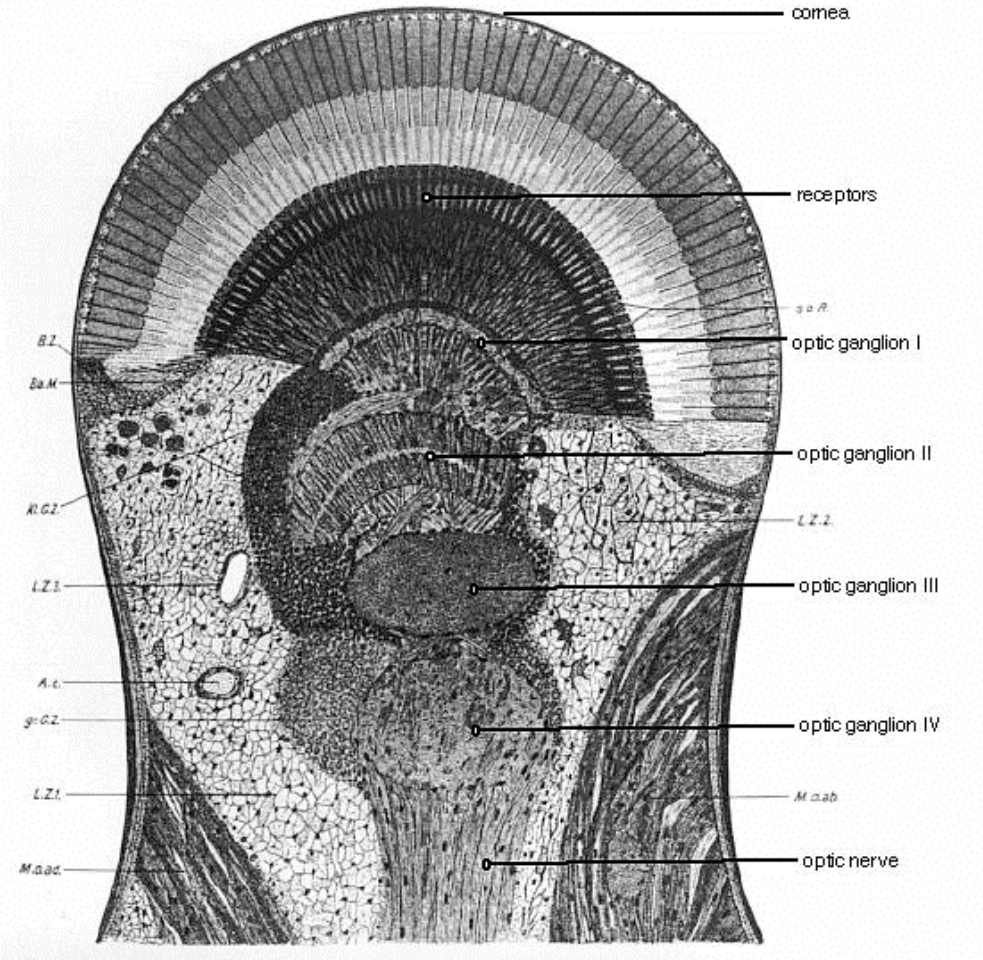
-can't roll over

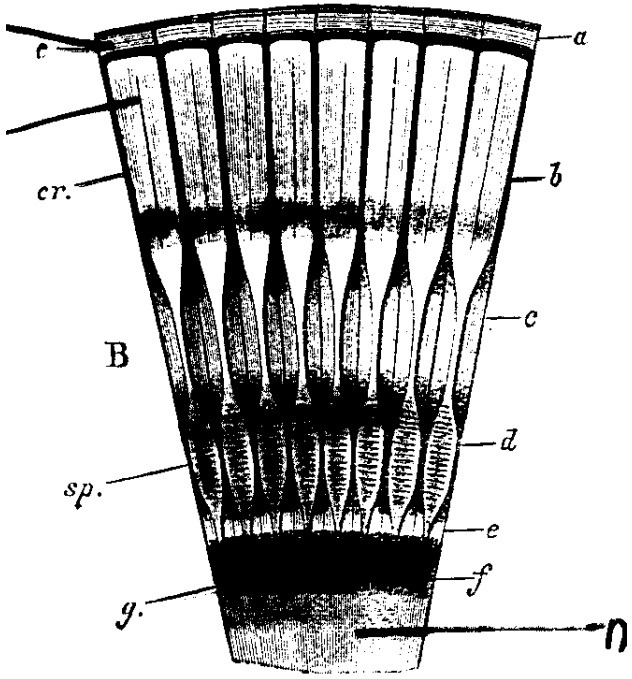
Crayfish compound eye





Longitudinal section through crayfish eye. (Bernhards, 1916)





Reproductive system

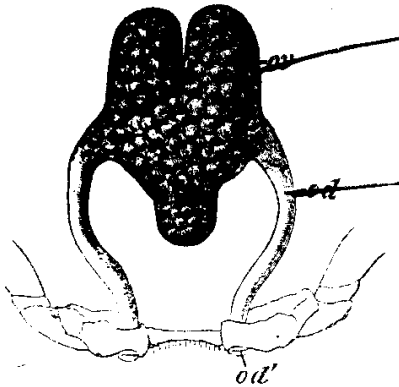
testis

sperm duct

♂

Base of 5th walking legs

Mature at 5 to 6 years
Live for 15 to 20 years



ovary

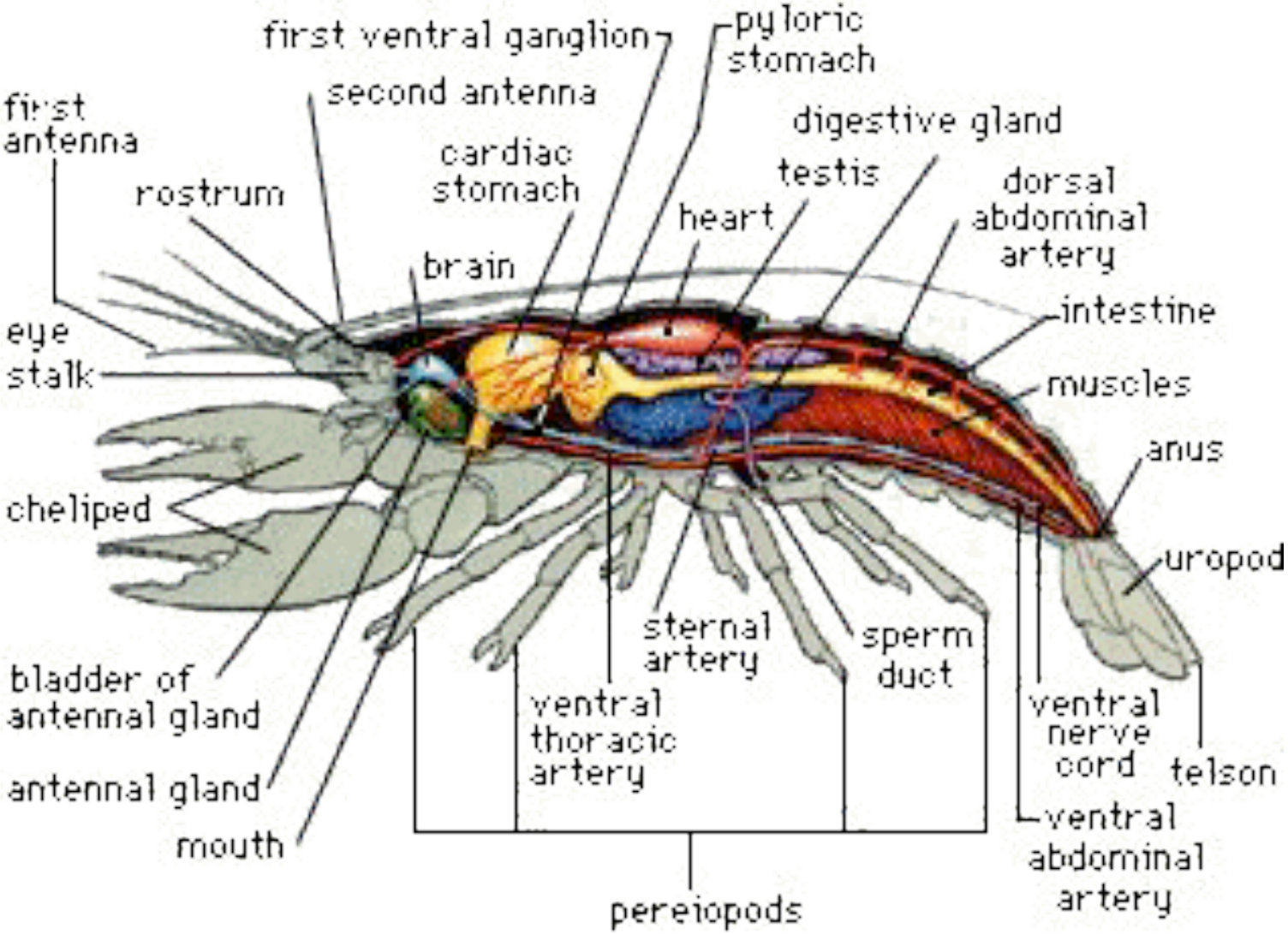
oviduct

♀

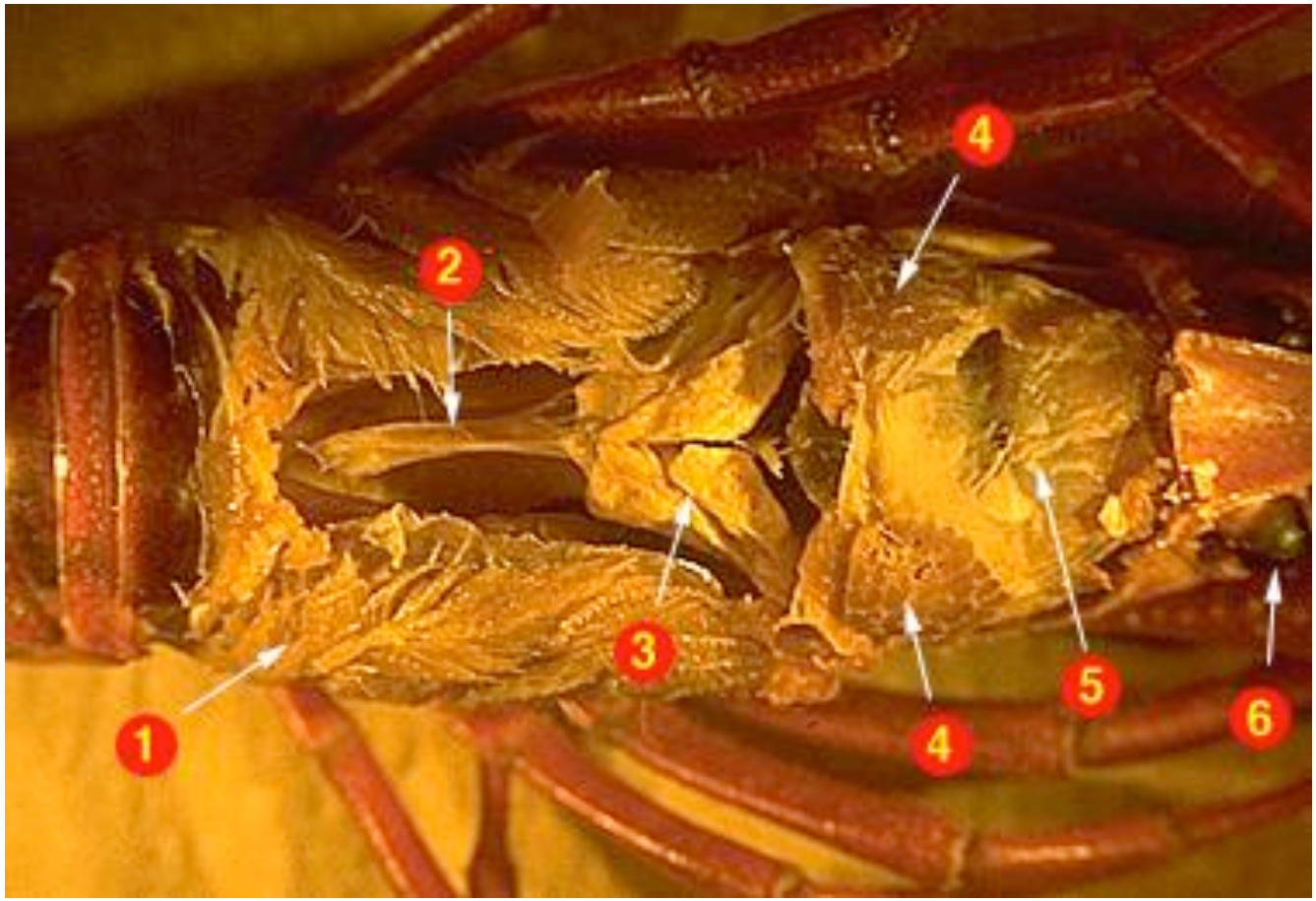
Base of 3rd walking legs

Get a big crayfish!

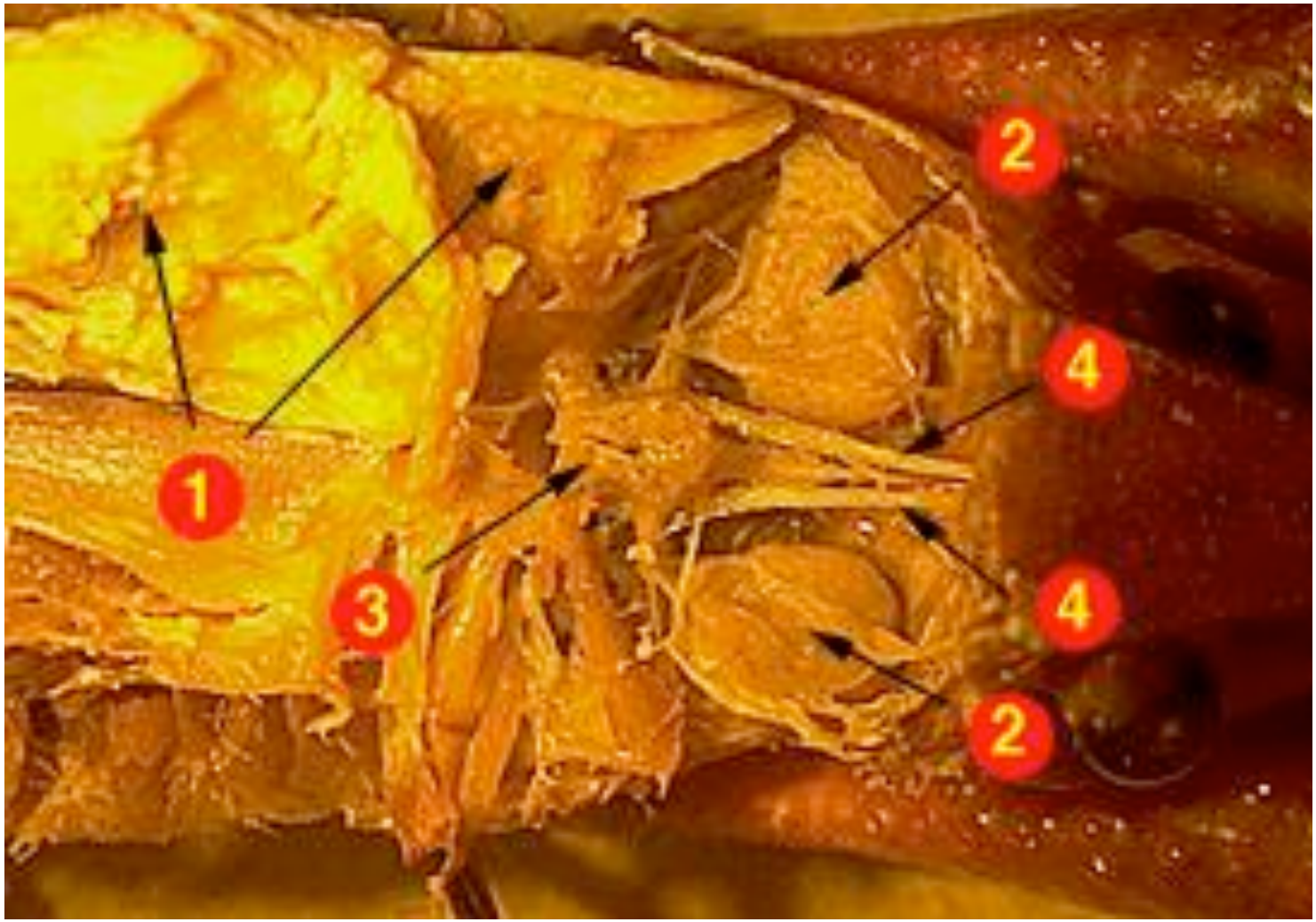
Internal glands



Cephalothorax dorsal view



Cephalothorax deeper dorsal view



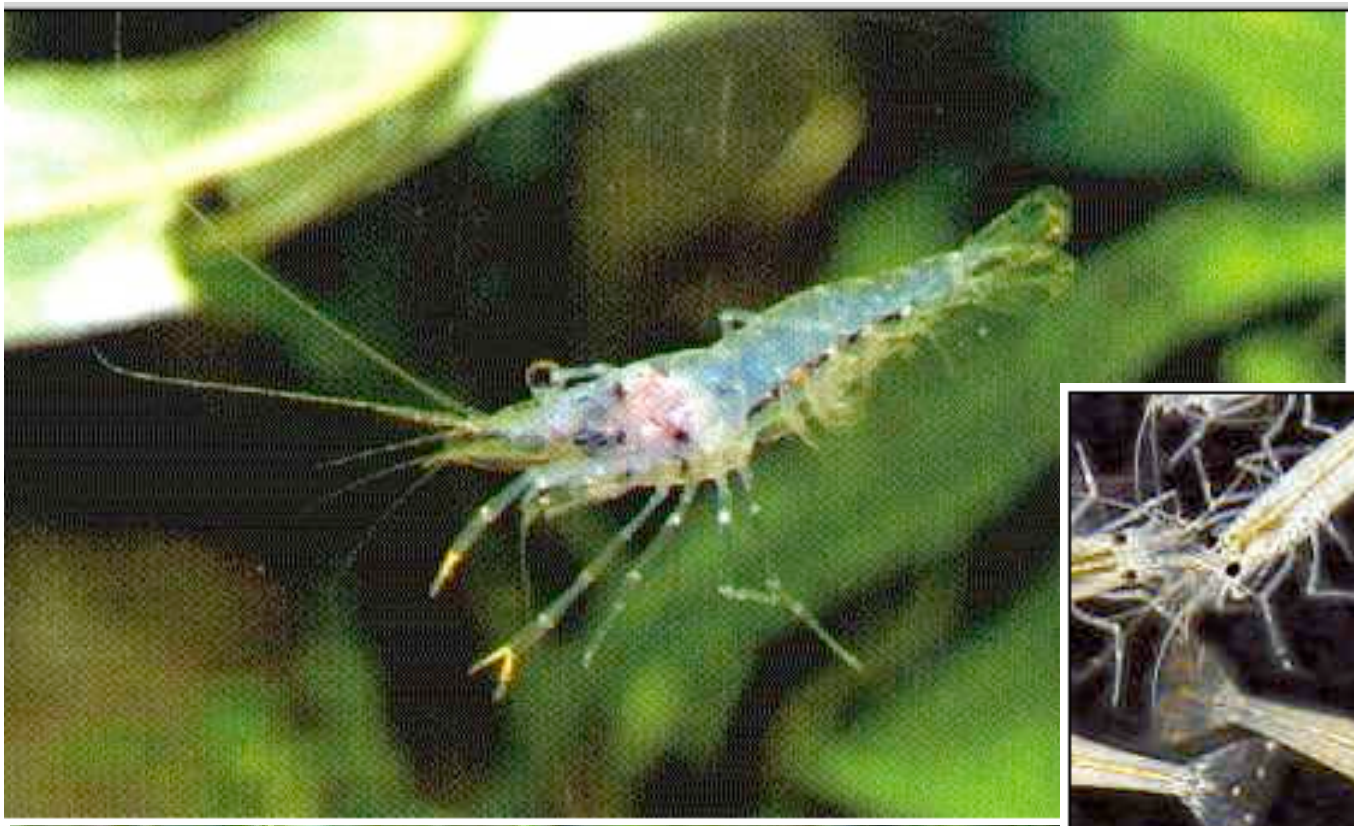
Ghost Shrimp

- Structurally and physiological similar to crayfish.
- Exoskeleton is transparent which lets you observe internal organs in a living organism.
- Compare what you observe in the crayfish dissection with that found in the shrimp.

Order Decapoda

- **Suborder Reptantia**
- (benthic animals more adapted for crawling)
  - Lobsters, crayfish, crabs

- **Suborder: Natantia**
- (body adapted for swimming)
  - shrimp

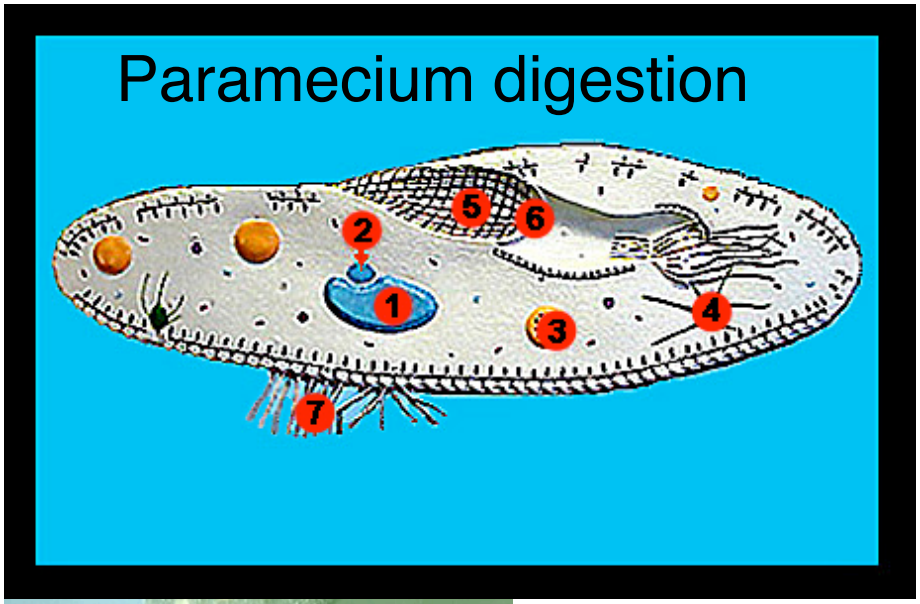


Amphipod-shrimp-like smaller than Ghost Shrimp so can be placed under higher magnification more easily.
Observe heart beat, respiration, blood cells.

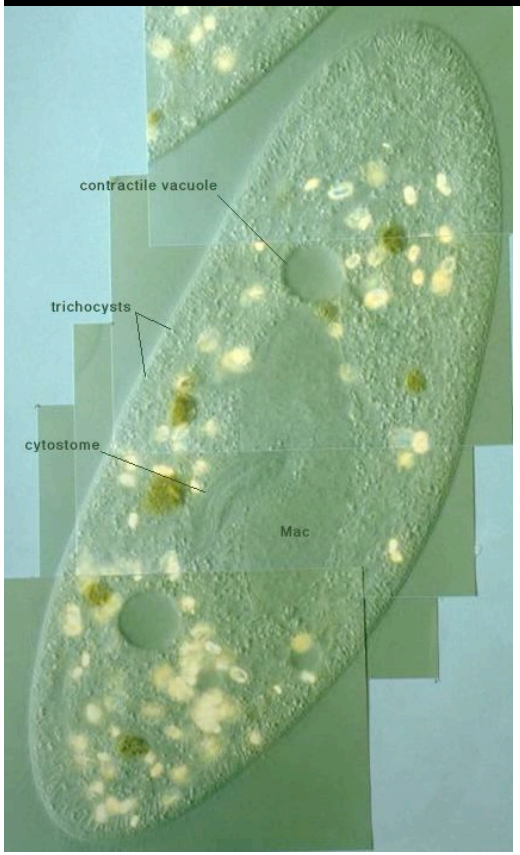
Food digestion

Kingdom Protista
Phylum Ciliophora

Genus *Paramecium*

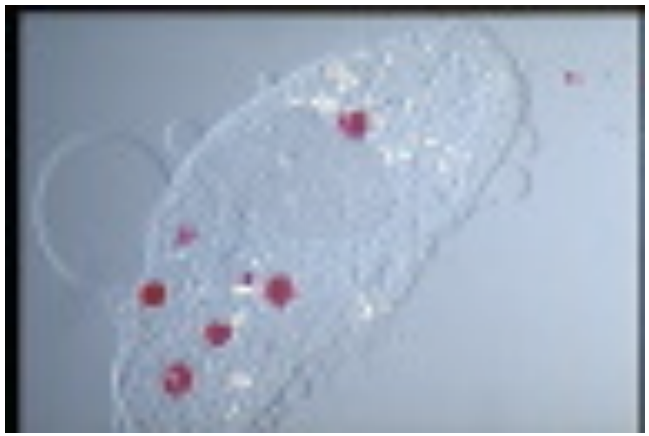


1. Macronucleus
2. Micronucleus
3. Food vacuole
4. Contractile vacuole 2
5. Oral groove
6. Buccal cavity
7. Trichocysts



Oral groove
Buccal cavity
Food vacuole
Circulate
Anal pore

Feed yeast stained with Congo red. pH indicator.



Rotifer contamination