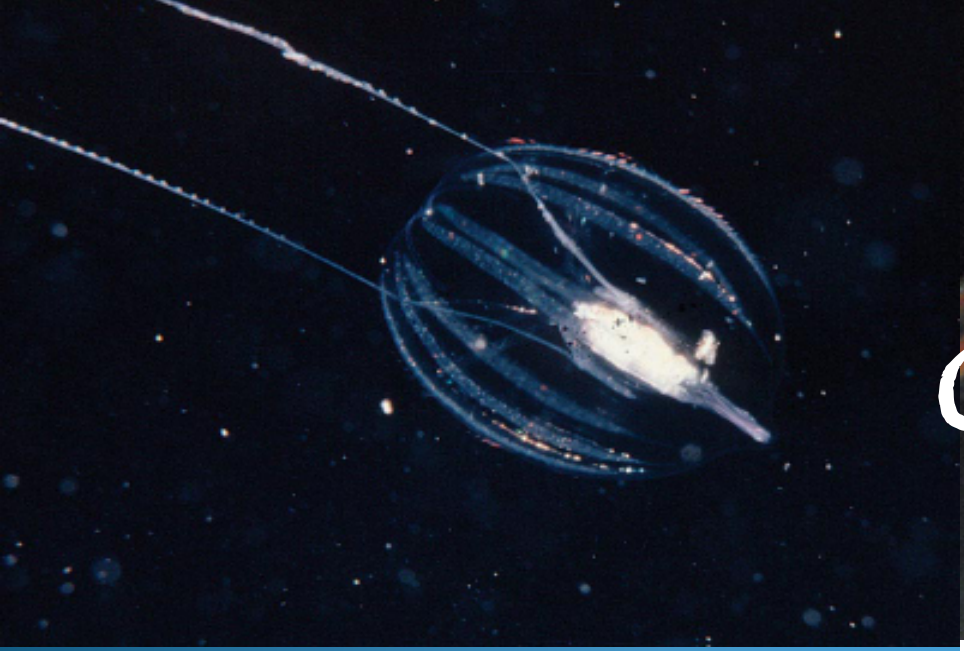
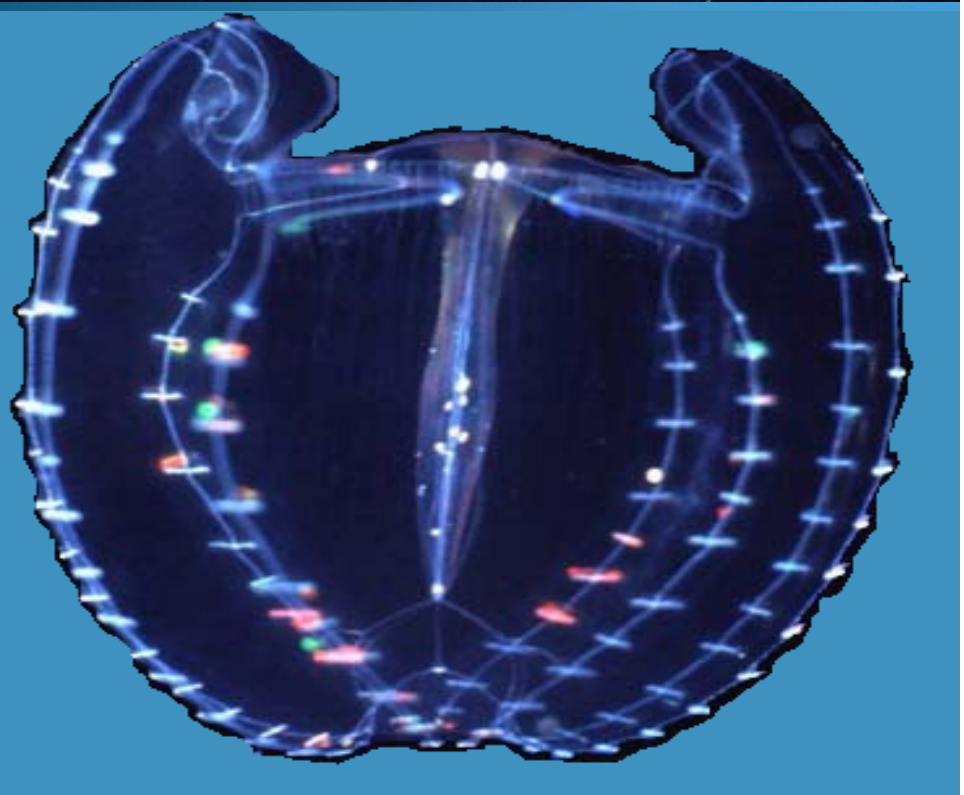
# CTENOPHORA





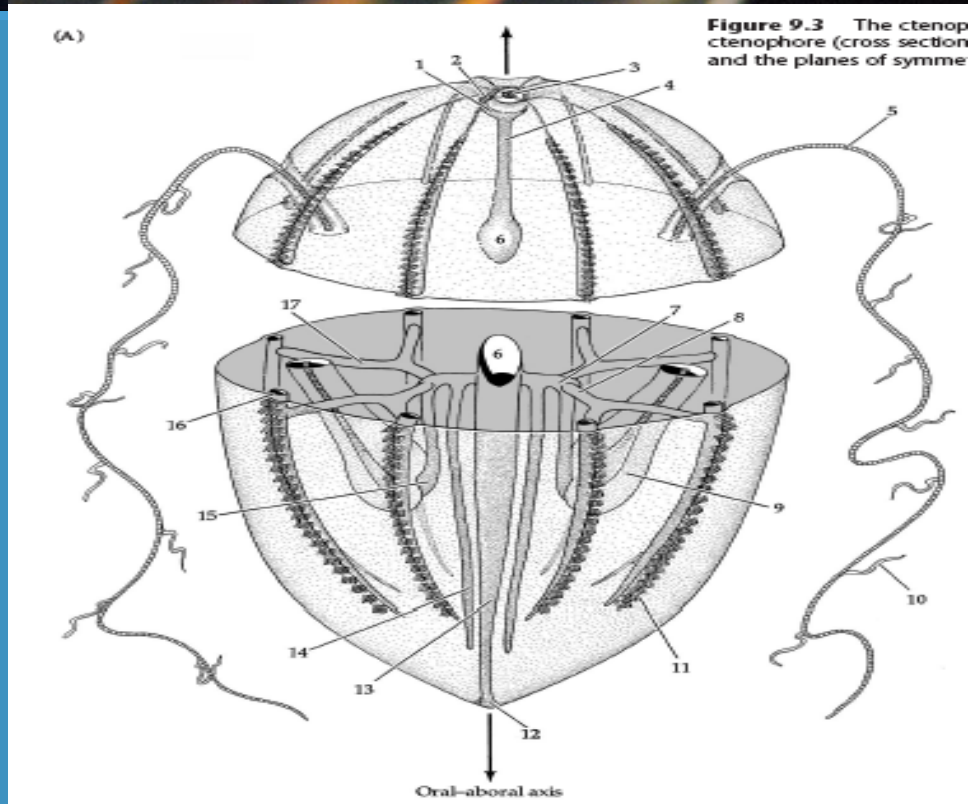



**Figure 9.3** The ctenop
ctenophore (cross section
and the planes of symme

# Common Names

Ctenophores are often called “comb jellies,” “sea gooseberries,” “sea walnuts,” or “Venus’s girdles.”

# I. Basic Characteristics

- **Ctenophora means comb bearing**
- **8 rows of cilia for locomotion**
- Biradial symmetry and three germ layers (epidermis, gastrodermis, mesoglea if included)
- Mesoglea holds muscle cells and amoebacytes
- **Bioluminescence- ability to produce light**

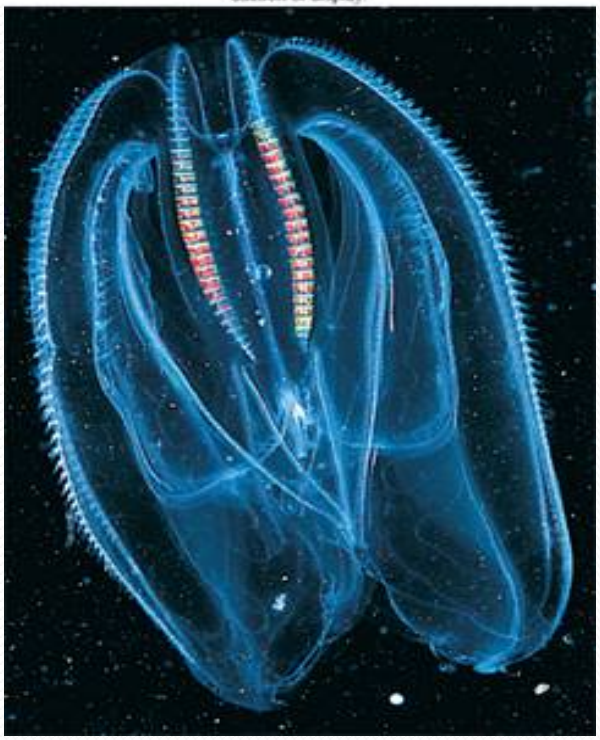
# I. Basic Characteristics

- Ctenophores have two digestive openings, but rarely use the anus for defecation
- Digestive system consists of mouth, pharynx, and stomach with a canal system
- Have no CNS or brain, but a nerve net
- Use an aboral sense organ with a statocyst to maintain balance
- All Ctenophores have a distinct larval form before adulthood

# I. Basic Characteristics

- Voracious feeders on copepods, fish eggs, crab larvae, shrimp larvae and other meroplankton
- Can double in size in 1 day!
- Important secondary consumers Long Island estuaries





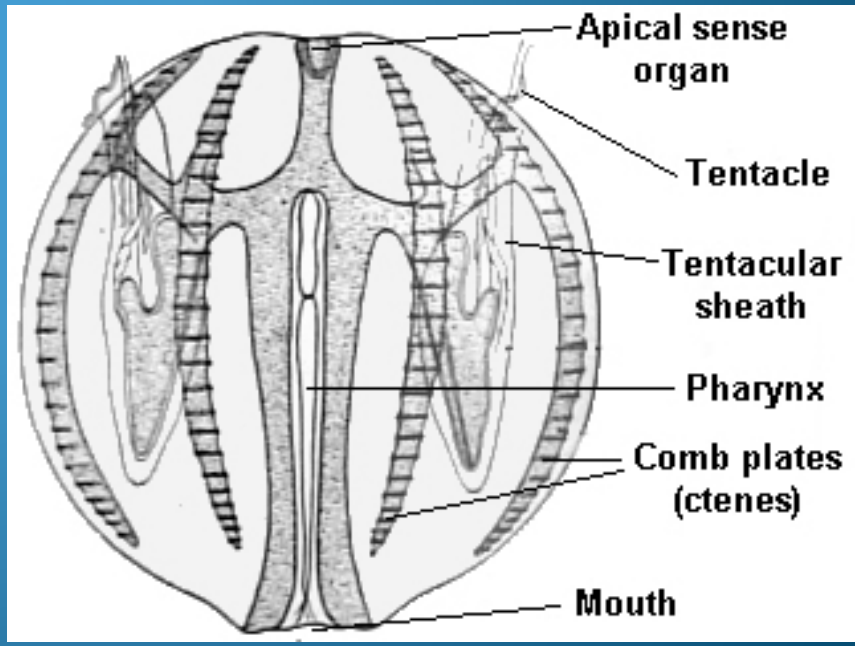
# I. Basic Characteristics

## E. Reproduction

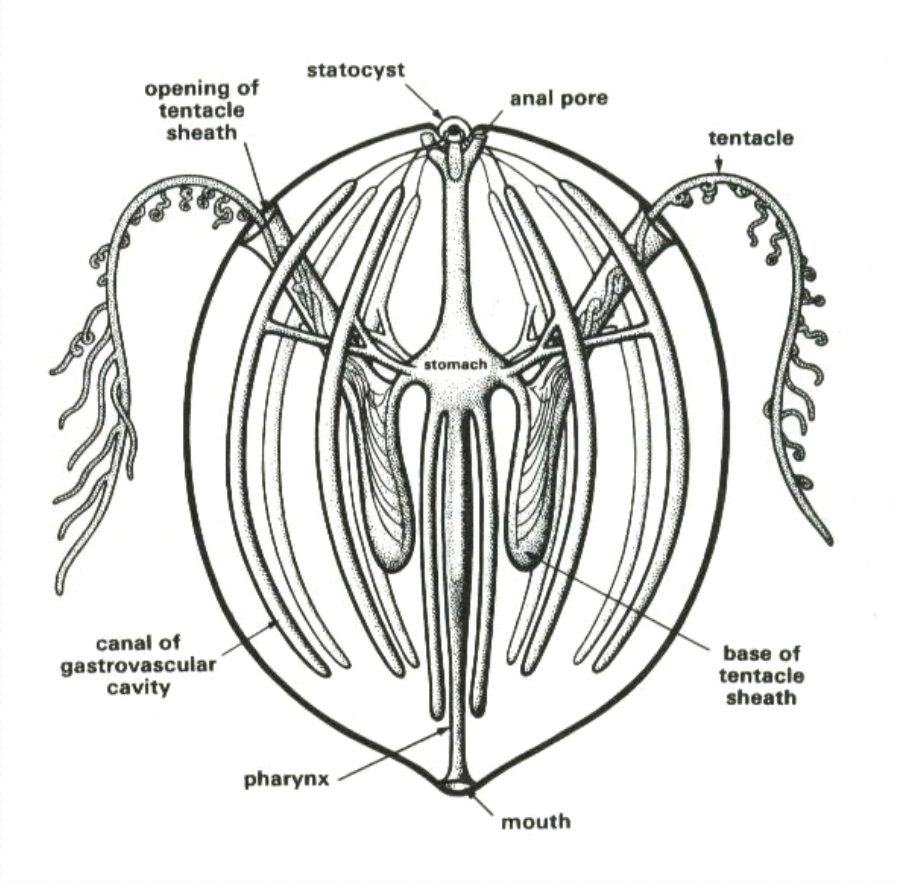
1. **Monoecious**
2. **Parent dies after releasing gametes**

# Morphology

Most ctenophores are round or spherical in body shape. They generally have two large tentacles and eight rows of comb plates. Their tentacles have the adhesive colloblasts to capture prey and they have a stomach, mouth, pharynx, and anal pores. They have a nerve network that is rather complex and an apical sense organ. All ctentophores are hermaphrodites and most reproduce sexually. They generally range in size from .6 cm to 30.5 cm.

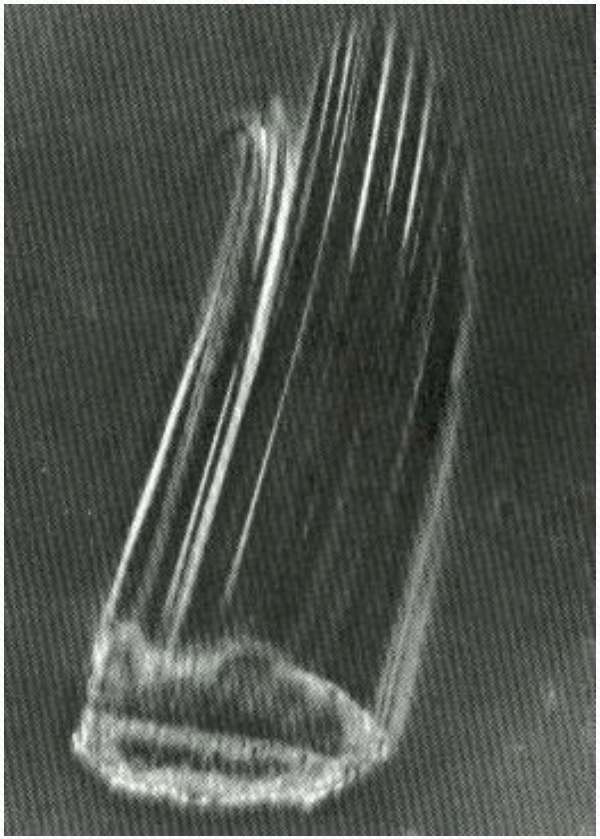


# Ctenophora Structure



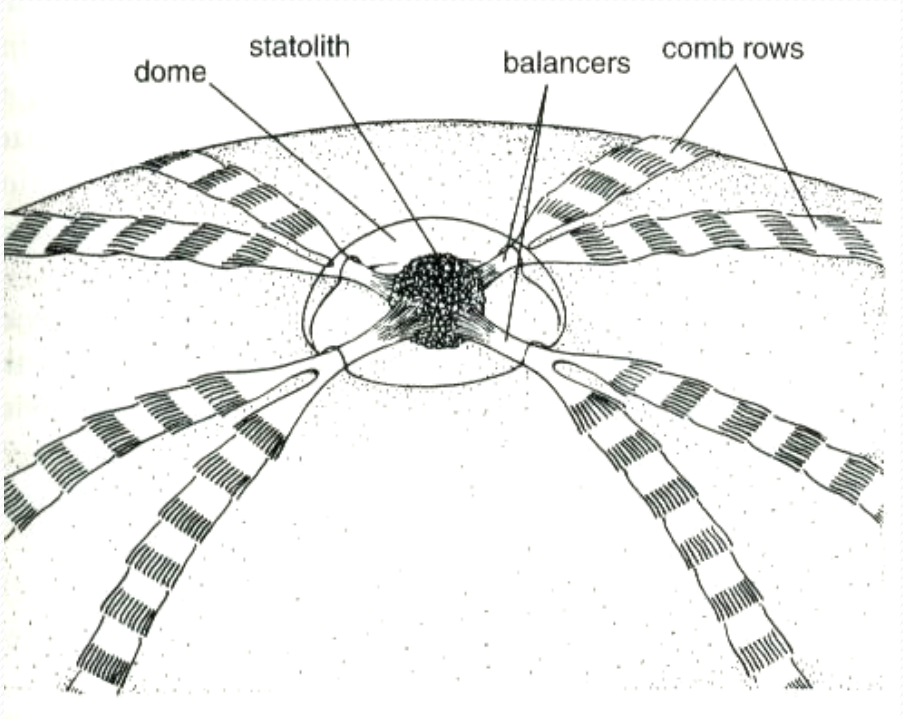

- Similar in structure to Cnidaria medusa
- Poorly studied due to fragile nature

# Ctenophore Structure



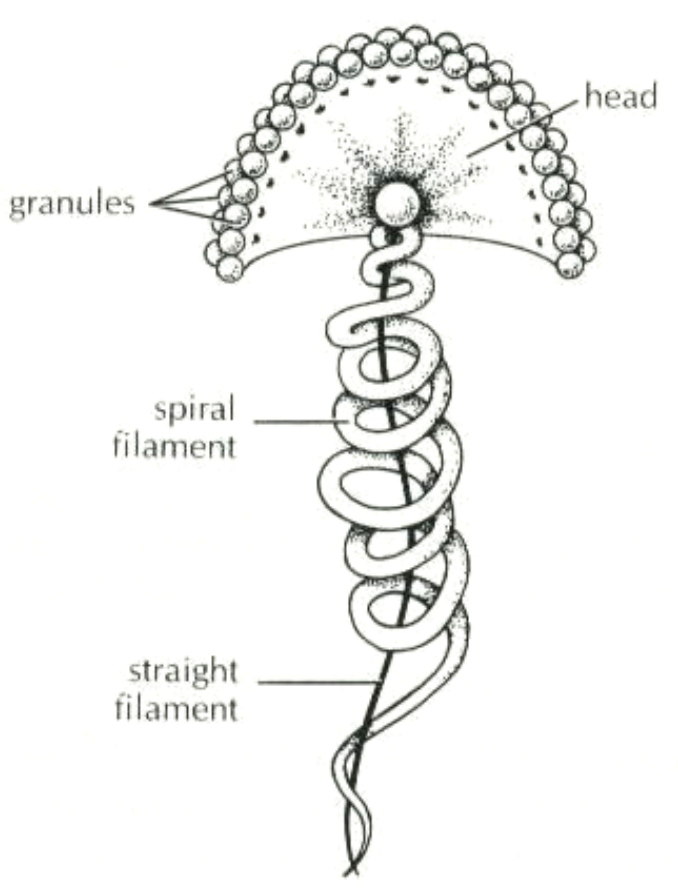
- Body surface has eight rows of comb-like paddles
- Comb paddle has thousands of cilia used to swim

# Apical Sense Organ




- Apical sense organ located on the aboral surface controls beating of cilia
  - Statolith and balancers

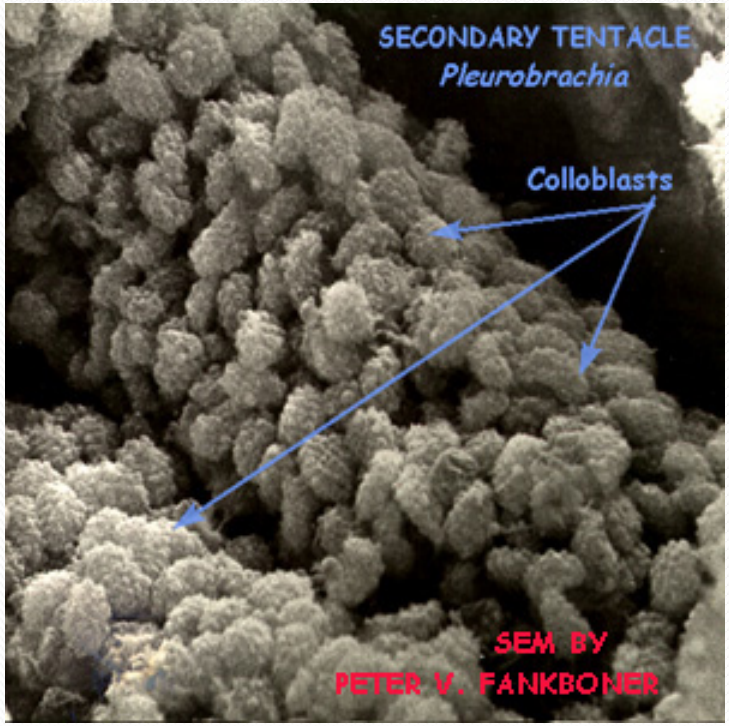
# Colloblasts



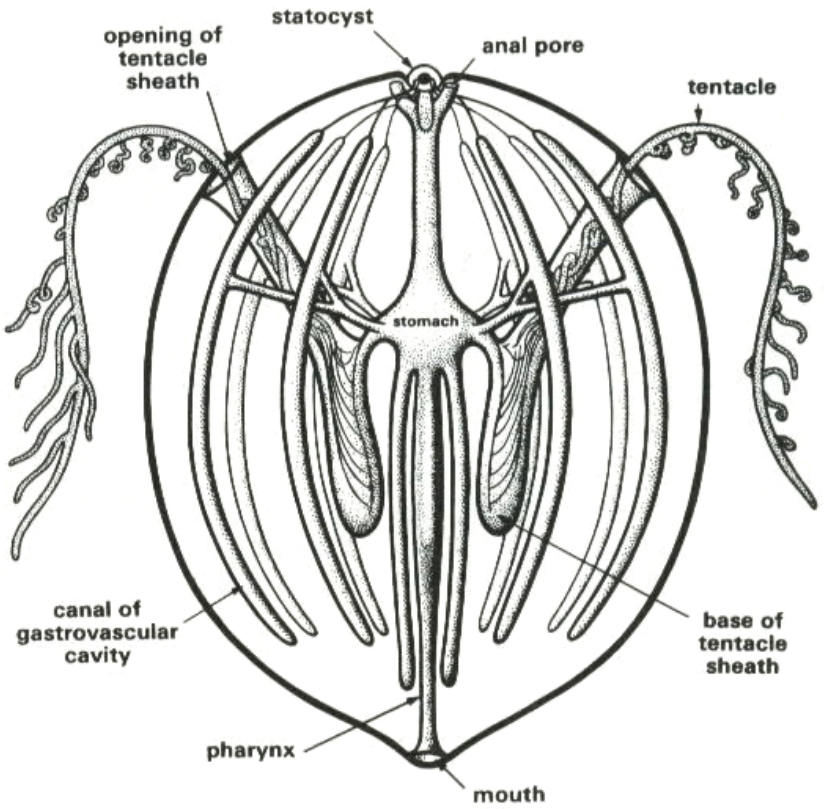

- Sticky retractile tentacle used to catch prey
  - Colloblast discharge an adhesive thread which is sticky to the touch
- Some spp. lack tentacles and the body is studded with colloblasts

# Colloblasts

Colloblasts are microscopic, sticky structures used to adhere to the prey of a ctenophore. Usually the classes Cydippida and Lobata have colloblasts on their tentacles. After a prey is caught by a colloblast, the tentacle is contracted and the prey is brought by the predator's mouth. There the prey is released and

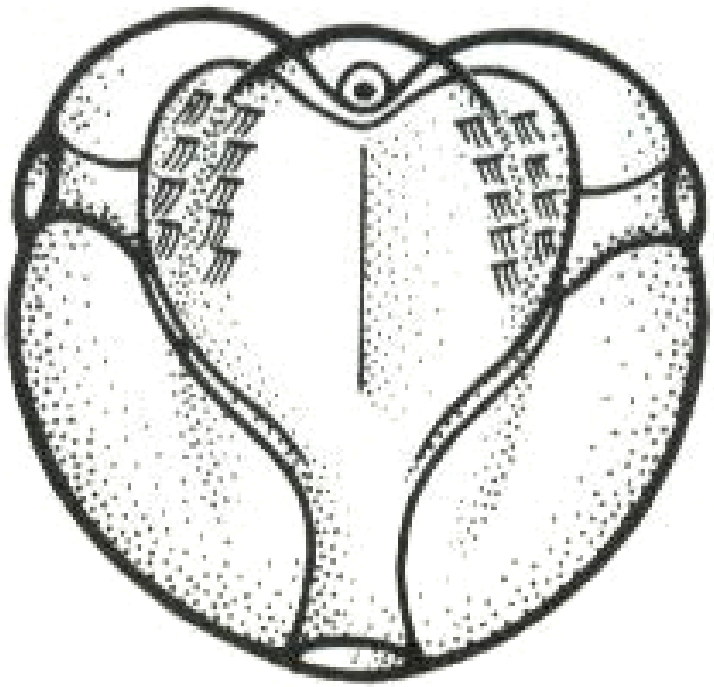


# Digestion




- Feed on plankton, other ctenophores and other Cnidarian jellies
- Gut extends through the entire body; mouth is at the oral end
- Anal pore is at the aboral end

# Reproduction



Developing **cydippid larva.**

- Can rapidly regenerate lost or damaged parts
- Usually hermaphrodites
- Developmental stage
  - Cydippid larva, this develops into an adult

# Compare to Coelenterates

A. Differences

1. Only 2 tentacles
2. One statocyst
3. No nematocysts
4. Colloblasts – sticky, adhesive cells on tentacles for feeding
5. No polymorphism
6. Never colonial
7. Has an anal opening

# Compare to Coelenterates

## B. Similarities

1. **Nerve net**
2. **Same 2 body layers**

   **epidermis**

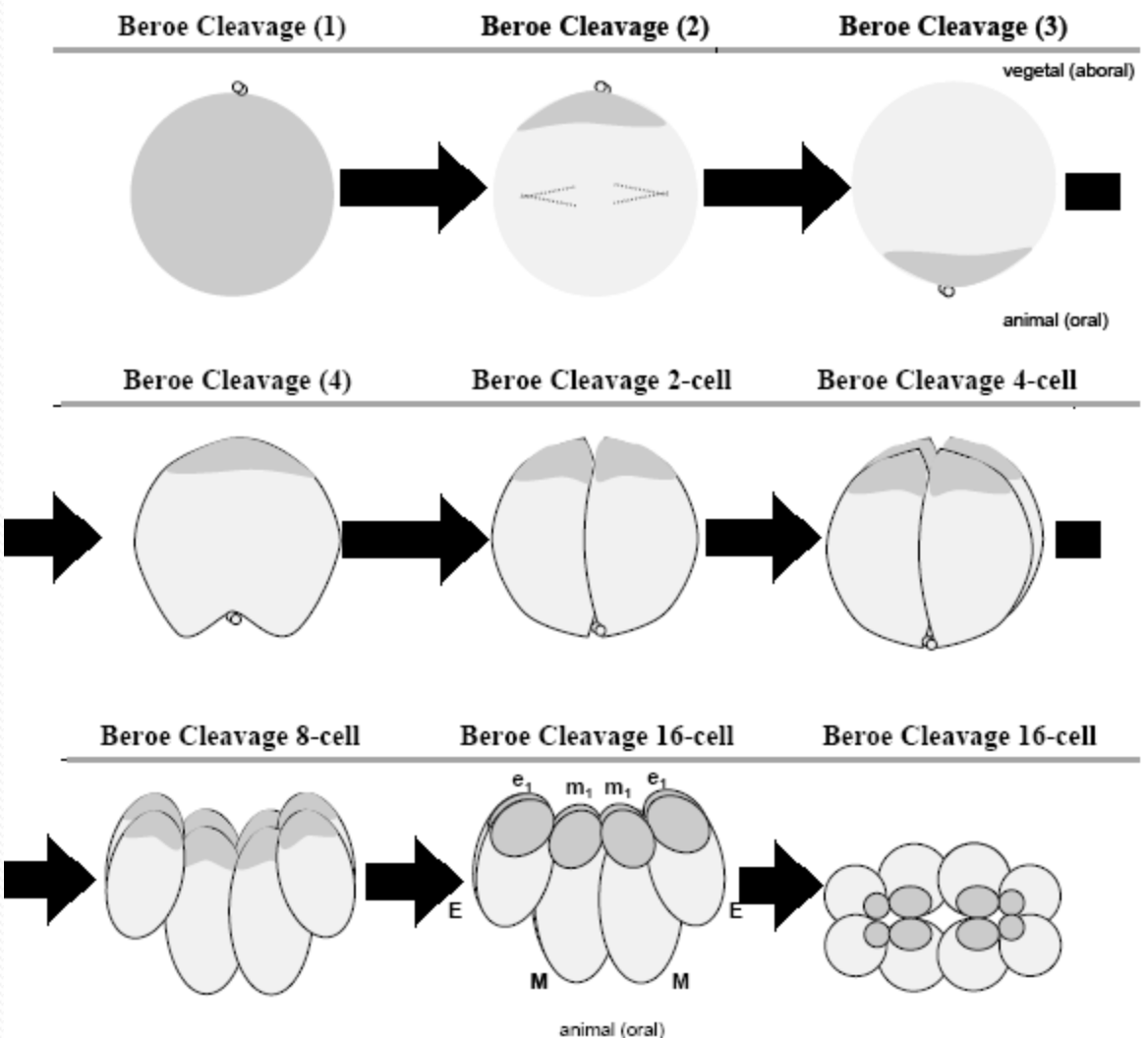
   **gastrodermis**

   **mesoglea *(have muscle)***

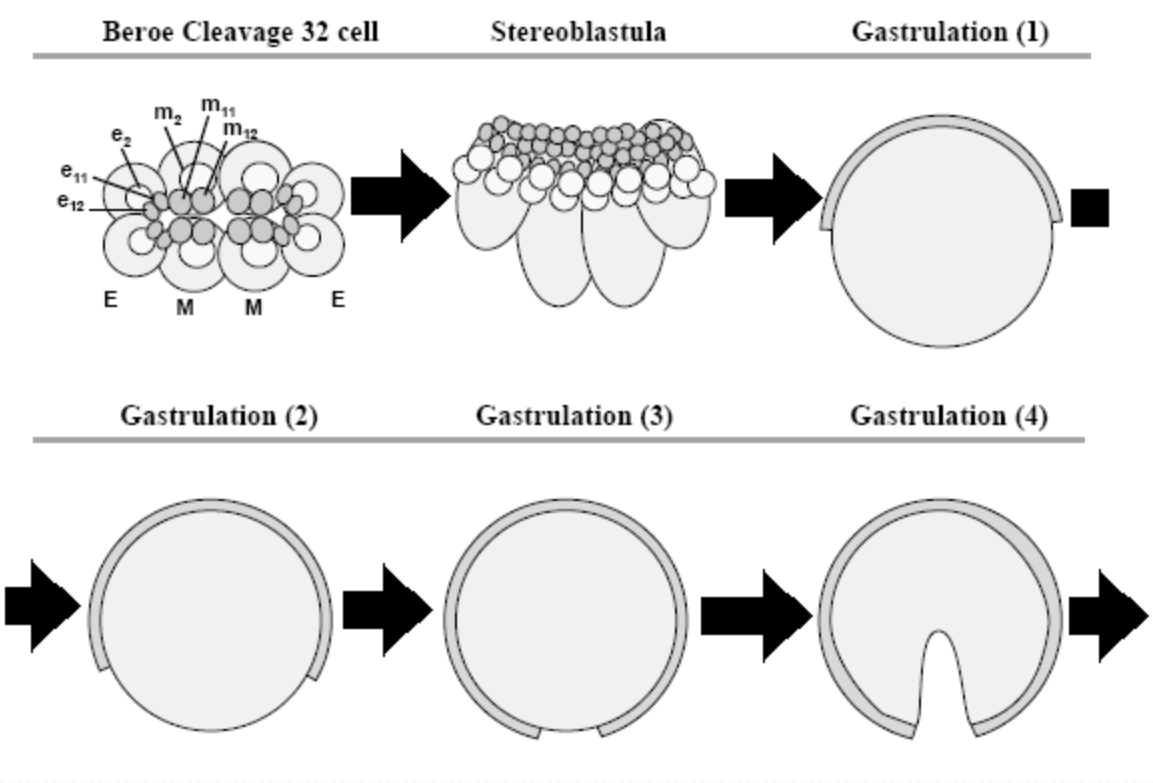
# Embryology

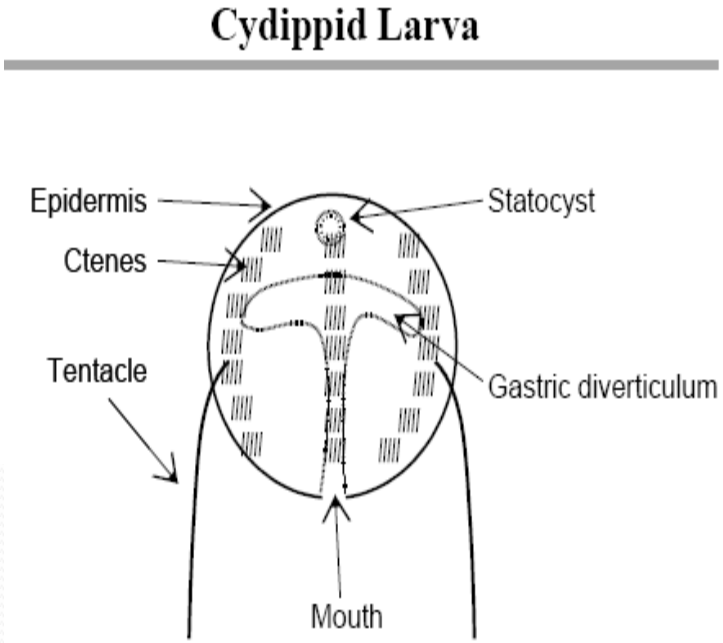
When the egg is fertilized, development of the embryo begins. Cleavage occurs completely but unequally, first producing two cells, then four, then eight, and so on until the embryo is full developed. The embryo forms within the egg cover. It develops double rows of cilia, a pair of lateral tentacles, and a large, apical sense-organ. The ectodermal layer of the gastrovascular system undergoes Epiauxesis. Epiauxesis involves the flattening and extension of the ectoderm germ layer in the gastrovascular system. Soon, the cilia begin to function and the developed larva breaks the egg shell and enters the water. The following pages are detailed steps to the process of initial cleavage and development.

# Development (Embryology)



# Development (Embryology)

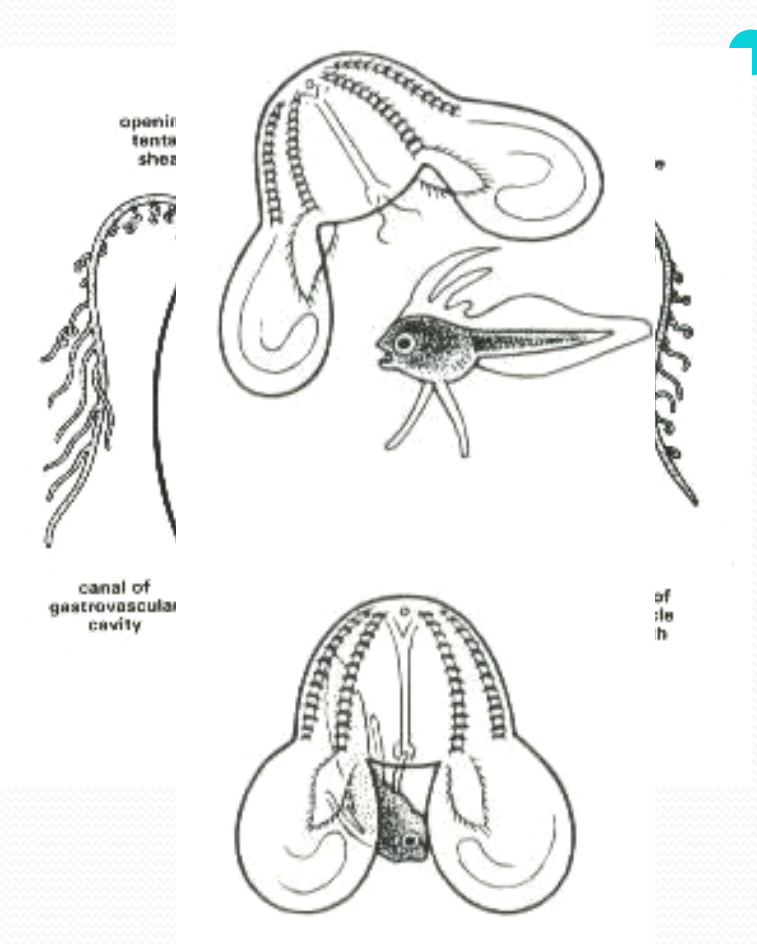


# Ctenophore diversity

- Most species live in the open ocean and are not well studied
  - New studies use submersibles and divers to collect specimens, eliminating specimen destruction by fast towed nets
- Phylum Ctenophora
  - Order Lobata
  - Order Beroida

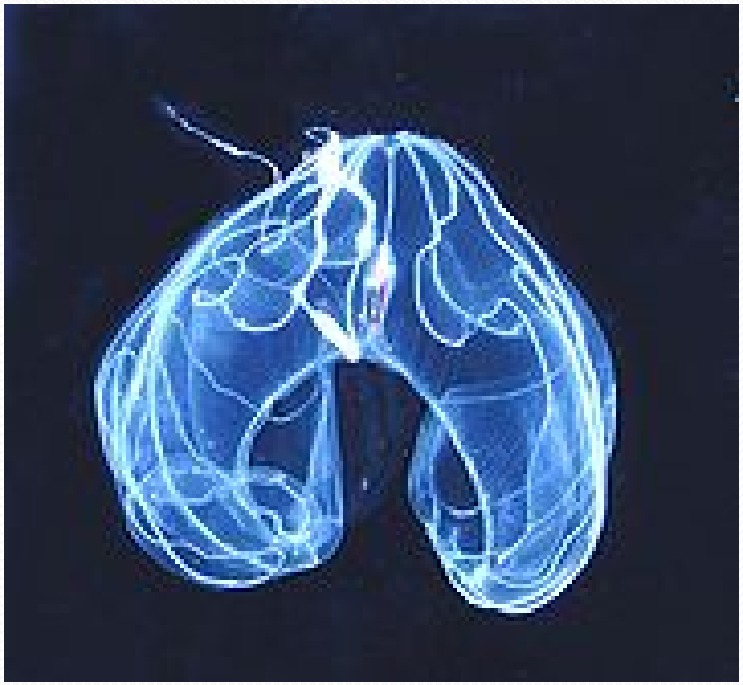
# Order Lobata



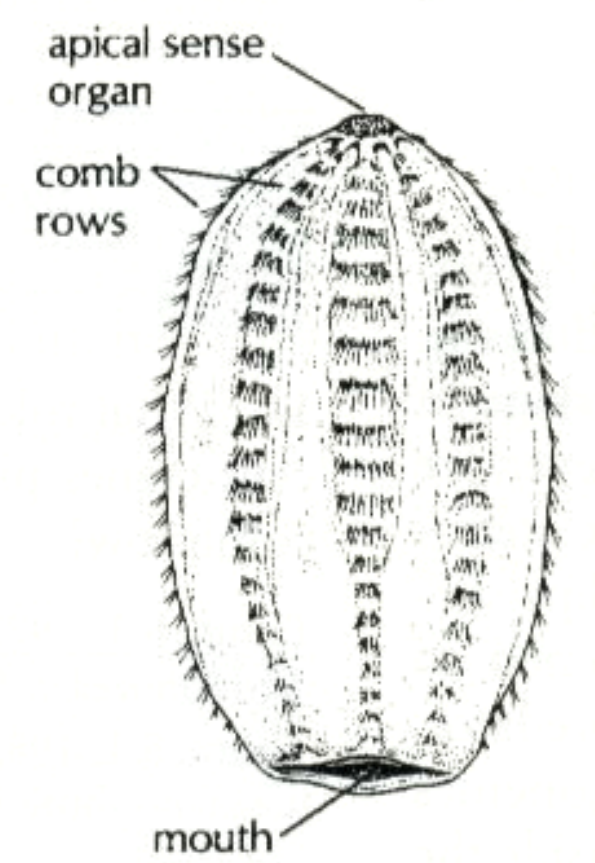

- Order Lobata
  - Posses long tentacles throughout the lifecycle
  - Retractile in nature

# Lobata (Morphology)

- Order also called Lobates
- Have pair of muscular lobes extending from mouth
- Tentacles in grooves on lobes, have auricles between lobes and mouth
- Auricles have cilia to create current and flush prey into the mouth
- Two comb rows on each lobe and two on each side between lobes
- Comb movement dependent on nerves rather than water movement
- Some can clap combs to push water rapidly and move opposite
- Generally prey on plankton



# Order Beroida




- Order Beroida
  - Lack tentacles, or oral lobes
  - Can consume prey substantially larger than itself
  - Cylindrical, flattened body
  - No tentacles

# Beroids (Morphology)

- Order also known as Nuda
- No feeding appendages, but pharynxes have macrocilia
- Macrocilia are large bundles of cilia that work to bite off pieces of whatever is being consumed
- Prey on other ctenophores
- When not eating, a ridge shuts the mouth by connecting with the other part of the ridge