Minor Phyla Ctenophora

Ctenophora is a small phylum of marine animals, which aree commonly known as sea walnuts or comb jellies.The phylum takes its name from two Greek words, Ktenos-Comb and Phoros-Bearing, as they possess 8 comb-like plates for locomotion. In previous classifications, ctenophores have been placed in subphylum Cnidaria under the phylum Coelenterata. But, the present tendency is to consider them as a separate phylum. Ctenophores were recognized as a distinct group by Eschscholtz and placed under a distinct phylum by Hatschek.

General Characters

1. Marine, solitary, free-swimming or pelagic. No polymorphism and no attached stages.
2. Body transparent. Symmetry biradial along an oral-aboral axis.
3. External surface with 8 vertical rows of comb plates of fused cilia, for locomotion. Hence the name comb jellies.
4. A pair of long, solid, retractile tentacles present.
5. Cell -tissue grade of body organization.
6. Body acoelomate and triploblastic, with an outer epidermis, inner gastrodermis, and middle jelly-like mesogloea with scattered cells and muscle fibres.
7. Digestive system with mouth, stomodaeum, complex gastrovascular canals and 2 aboral anal pores.
8. Nematocysts absent. Instead, special adhesive and sensory cells, called colloblasts; present on tentacles, help in food capture.
9. Skeletal, circulatory, respiratory and excretory organs absent.
10. Nervous system diffuse. Aboral end bears a sensory organ, the statocyst.
11. All monoecious (hermaphrodite). Gonads develop side by side on digestive canals and develop from endoderm.
12. Development usually includes a characteristic cydippid Larva.
13. Asexual reproduction and alternation generations absent.
14. Regeneration and paedogenesis common.

Classification: Phylum Ctenophora contains about 100 known species grouped in 2 classes, as follows:

Class 1. Tentaculata 1.

Ctenophores with 2 long aboral tentacles.

Order 1. Cydippida.

1. Body rounded or oval.
2. Tentacles branched retractile into pouches.

Examples Pleurobrachia, Hormiphora, Mertensia

Order 2. Lobata .

1. Body oval, laterally compressed.
2. Two large oral lobes and 4 slender flap-like auricles around mouth and

3. Pouched tentacles in larva, reduced and without pouch in adult.

Examples: Mnemiopsis, Bolinopsis .

Order 3. Cestida

1. Body elongated, flat, ribbon-like 5.

2. Two main tentacles in sheaths but reduced. Many small lateral tentacles along oral edge.

3. Four comb plates prominent, four rudimentary.

Examples: Velamen, Cestum

Order 4. Platyctenea

1. Body much flat, oral-aborally compressed.

2. Tentacles well-developed, with sheath.

3. Comb plates reduced or absent in adult.

4. Adapted for creeping.

Examples Ctenoplana, Coeloplana.

Class 2. Nuda

Ctenophores without tentacles.

Order 5. Beroida

1. No tentacles and oral lobes.

2. Body conical and laterally compressed.

3. Mouth large. Stomach voluminous.

Example: Beroe.

Aftinities

Different workers have dissimilar views regarding origin and relationships of ctenophores. No fossil record is available due to their soft bodies. In the absence of fossils, their origin remains obscure.

Affinities with coelenterata. In the beginning, Eschscholtz (1829-1833) regarded Ctenophora as a class under phylum Coelenterata.

a). Resemblances with Coelentrata:

1There are many morphological similarities between Ctenophora and Coelenterata:;

1. Biradial symmetry.

2. Body parts arranged along an oral-aboral axis.

3. Presence of geltinous mesogloea.

4. Lack of organ-systems (tissue grade).

5. No coelom. Single gastrovascular cavity.

6. Diffuse nerve net or plexus.

7. Presence of statocysts.

8. Endodermal origin of gonads.

(b) Differences from Coelentrata.

1. Tentacles oppositely placed. Symmetry bilateral.

2. No polymorphism. No colony formation.

3. Presence of 8 comb plates for locomotion.

4. Mesenchymal muscles present. No epithelio- muscular fibres.

5. Nematocysts absent. Instead, special sensory

cells or colloblasts present on tentacles.

6. Statocyst present aborally, not marginally.

7. Gastrovascular system with anal pores more organized.

8. Development determinate type.

2. Affinities with Platyhelminthes.

1. Platyctenea ctenophores (Ctenoplana and Coeloplana) show certain resemblances with polyclad turbellarians (Cestoplana).
2. Dorso-ventrally flattened body.
3. Crawling mode of life,
4. Ectoderm ciliated.
5. Lobed gastrovascular cavity, especially in embryos.
6. Gelatinous mesenchyme with muscle fibres and cells.
7. Similar earlier stages of segmentation and gastrulation.

On account of these similarities, Ctenoplana and Coeloplana have been considered as missing links between Coelenterata and Platyhelminthes.

This view is no longer supported because Ctenoplana and Coeloplana are now considered typical ctenophores adapted for a creeping mode of life.

References:

1. Minor phyla by R.L. Kotpal
2. An introduction to Minor Phyla by Sandhu and Bhaskar
3. Modern textbook of Zoology Invertebrates by R.L. Kotpal