TOPIC: CTENAPHORA:STRUCTURE AND AFFINITIES-II

LECTURE NO:21

B.SC PART 1

ZOOLOGY(HONS.)-PAPER I-GROUP A

CHAPTER 6

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Respiratory and Excretory System of Ctenophores:
There are no respiratory structures. Gaseous exchange takes place through general body surface.

Excretory System:
No definite excretory organs. Cell rosettes consisting of a double circlet of ciliated gastrodermal cells, surround openings leading from the gastrovascular canals to the mesogloea. They may be excretory or osmoregulatory.

Nervous System of Ctenophores:
There is no localized control centre. The epidermal nerve plexus is concentrated in a ring around the mouth, and at the base of the comb rows, where it forms the radial nerves. The nerves are not true nerves, but the condensation of the nerve net. The nervous system controls muscular movements and determines the. activity of cilia on the combrows.

The aboral sense organ is a statocyst or balance organ useful in maintaining normal orientation.

Reproductive System and Development of Ctenophores:
All are hermaphrodites. Reproduction is sexual only and asexual reproduction is totally absent. Gonads develop from endoderm in the form of bands in the meridional canals of the gastrovascular system.

Development:
Generally fertilization is external. Cleavage is total, determinate and unique in ctenophores called disymmetrical. Usually free swimming characteristic cydippid larva occurs which undergoes gradual metamorphosis. Some ctenophores exhibit a strange phenomenon called dissogeny in which both the larva and adult reproduce sexually. There is no alternation of generation.

Ctenophores have great powers of regeneration. Lost or wounded parts, even the statocyst, are replaced or repaired by regeneration.

Affinities of Ctenophores:
Many zoologists still keep ctenophores as Acnidaria, a subphylum of Colenterata.

The affinities of these animals can be studied under following heads:
1. Affinities with Cnidaria

2. Affinities with Platyhelminthes.

1. Affinities with Cnidaria:
Ctenophores resemble Cnidaria in:
1. Having a strong biradial symmetry and an oral-aboral axis.

2. Diploblastic body.

3. Medusa like body with a gelatinous mesenchymal mesogloea.

4. Absence of coelom.

5. Similar but more advanced endodermal gastrovascular cavity.

6. Diffused epidermal nerve plexus.

7. Presence of statocyst.

8. Absence of nephridia.

9. Absence of respiratory organs.

10. Endodermal gonads.

On the basis of above affinities with cnidaria, many zoologists treat them as a class of phylum Coelenterata.

(a) Affinities with Hydrozoa:
Ctenophores show following resemblances with Hydrozoa:
1. General body surface corresponds to exumbrellar surface of a medusa.

2. Stomodaeum corresponds to subumbrellar surface of medusa.

3. Simple gastrovascular cavity.

4. Thick, gelatinous mesogloea.

5. Two opposite tentacles in sheath.

(b) Affinities with Anthozoa:
1. Ciliated ectoderm of Anthozoa is forerunner of combplate.

2. A well-developed stomodaeum.

3. Endodermal gonads.

4. Release of gametes through mouth.

5. Biradial symmetry.

6. Gut in embryos four lobed.

7. Cellular mesogloea.

Differences from Cnidaria:

1. Presence of combplates.

2. No tentacles around mouth.

3. Presence of colloblasts.

4. An aboral sense organ.

5. Mesenchymal muscles.

6. Definite organization of digestive system.

7. Presence of anal pores.

8. Determinate cleavage.

9. Absence of a planula larva.

10. Presence of cydippid larva.

11. Complete absence of polymorphism.

12. Absence of alternation of generation and asexual reproduction.

2. Affinities with Platyhelminthes:
Two ctenophores viz. Coeloplana and Ctenoplana exhibit following resemblances with polyclad turbellarians.

1. Dorsollventrally flattened body.

2. Crawling mode of locomotion.

3. Ciliated epidermis.

4. Lobed gastrovascular cavity.

Conclusion:
Ctenophora have many advanced features comparing to coelenterate. They are intermediate between radiata and bilateria. They represent a blind offshoot from Cnidaria and not direct line in ancestry of flatworms. On account of many striking characteristics it is more logical to treat them as a separate phylum.