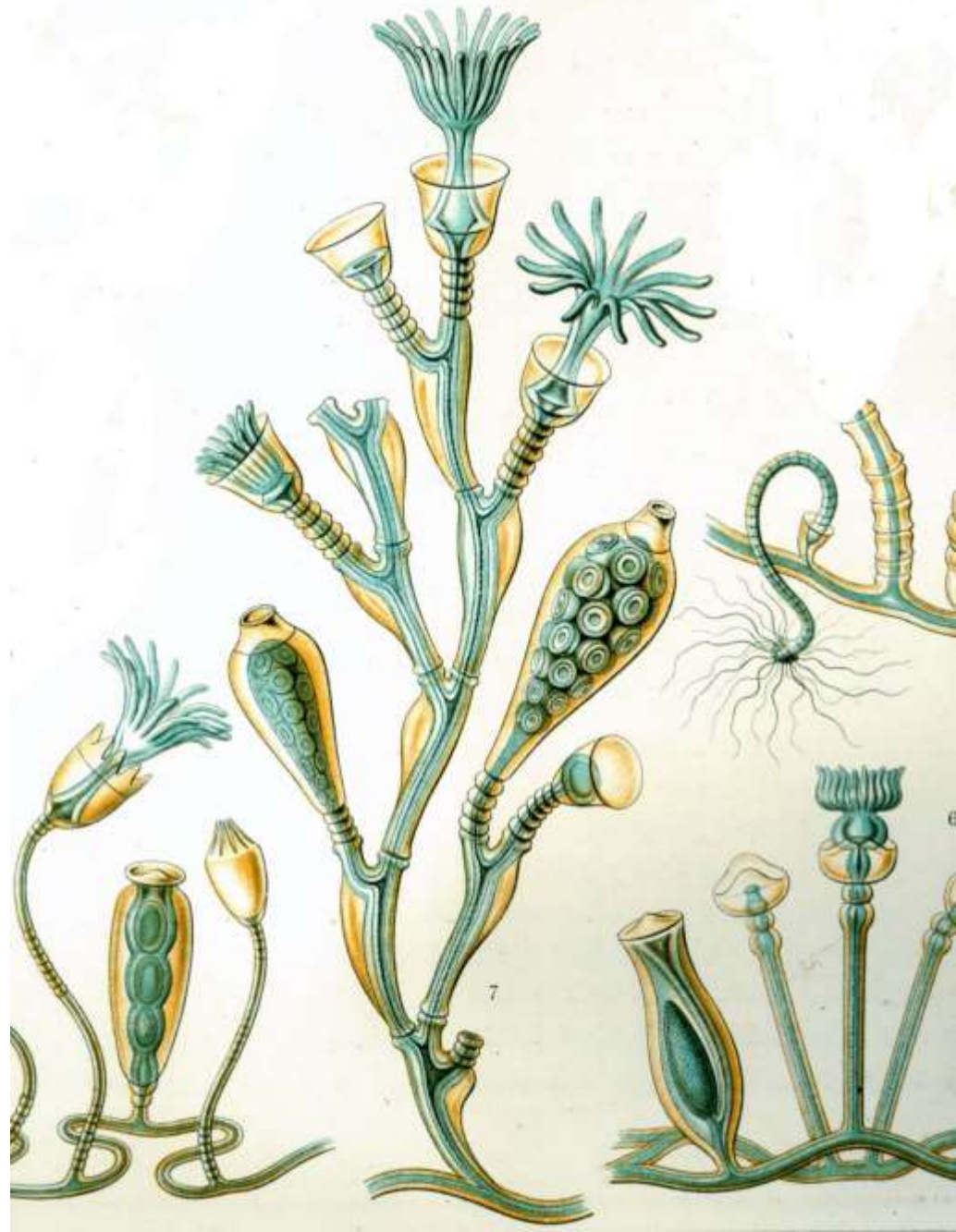


# Metagenesis in *Obelia* sp.

*Presented  
by  
Debolina  
Saha*



# What is **Metagenesis**?

- It is True alternation of generations occurs where a diploid asexually reproducing generation alternate with a sexual haploid generation.
- Example: Metagenesis is shown in *Obelia* sp.(a Cnidarian)

# *Obelia* sp. – A Brief introduction about it

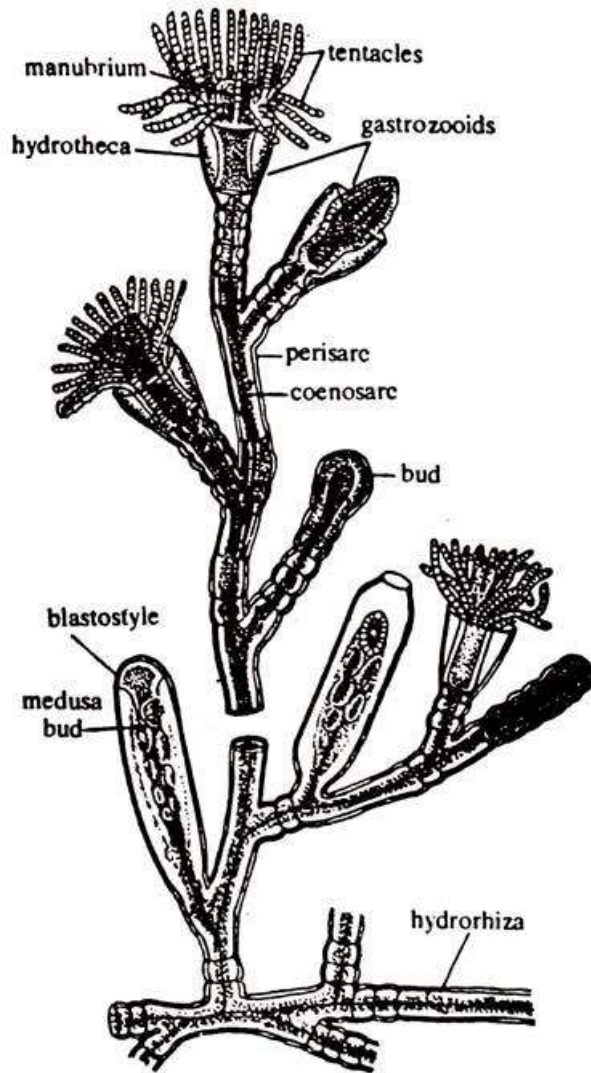


Fig. 20.12. *Obelia geniculata*

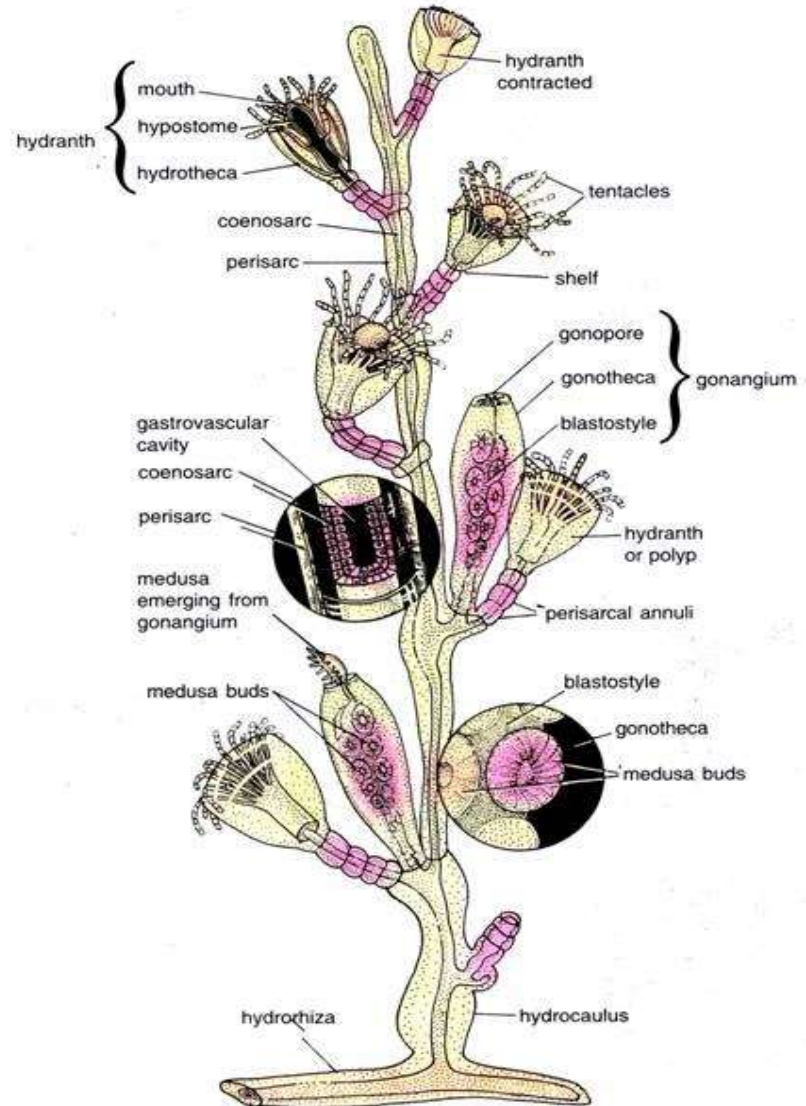


Fig. 32.1. *Obelia*. A portion of colony.

# *Obelia* sp. – A Brief introduction about it

- Commonly known as **Sea- Fur**
- *Obelia* is sedentary, marine colonial form found attached on the surface of sea weeds, molluscan shells, rocks and wooden piles in shallow water .
- Each colony of *Obelia* consists of a horizontal thread-like root called hydrorhiza which is attached to a weed or any substratum. From hydrorhiza arises a vertical branching stem about 2.5 cm long which is known as a hydrocaulus. The hydrorhiza and hydrocaulus are hollow tubes.
- The hydrocaulus bears zooids or polyps on either side in a cymose formation. Each polyp has a stem and a terminal head called a hydranth. The hydranths are feeding polyps, they feed by capturing minute animals and larvae. Towards the base of the hydrocaulus in the axils of the polyps, are reproductive polyps called blastostyles.
- The entire colony is covered by a tough, yellow chitin secreted by the ectoderm, this covering is known as perisarc. The perisarc around a blastostyle is a gonotheca, the blastostyle and gonotheca are together called a gonangium.
- **The *Obelia* is a trimorphic colony, that is, having three kinds of zooids which are as follows:**
  1. Polyps or hydranths (nutritive zooids);
  2. Gonangia or blastostyles (budding zooids);
  3. Medusae (sexual zooids).

# Polyp and Medusa- the Asexual and Sexual stages of *Obelia* sp.

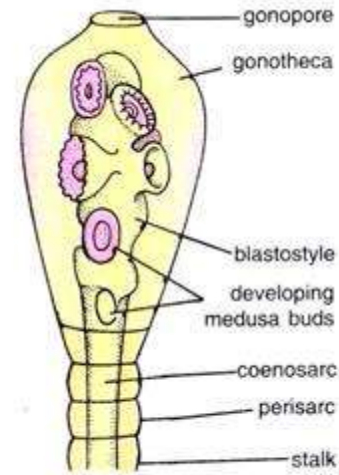
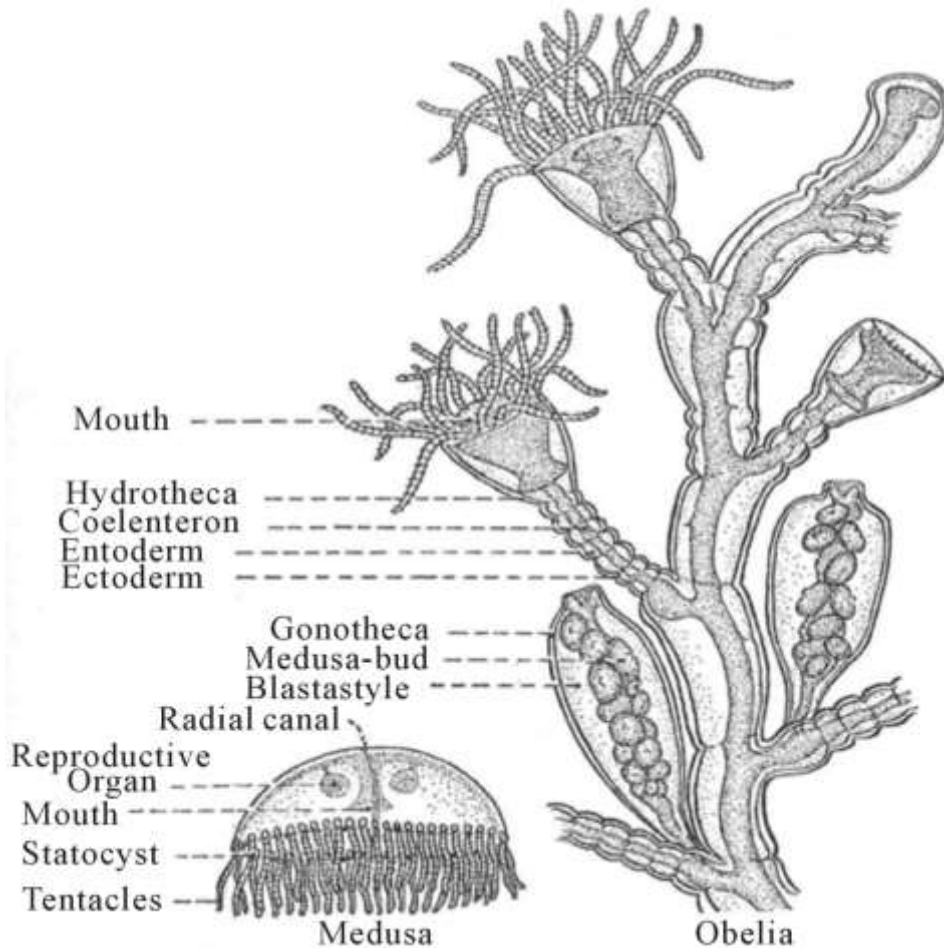


Fig. 32.3. *Obelia*. A gonangium.

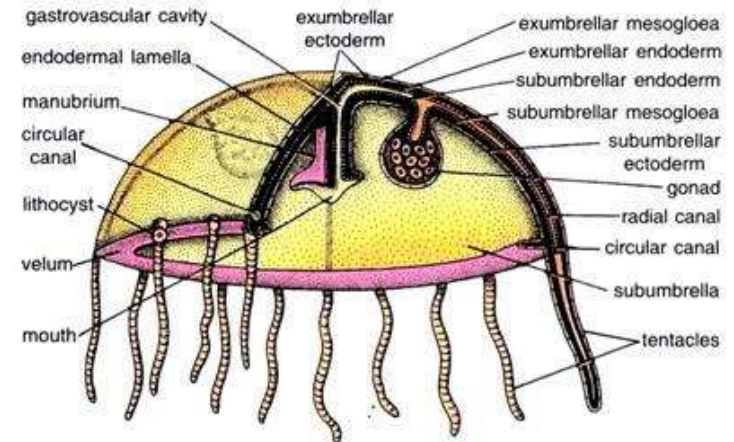


Fig. 32.6. *Obelia*. Diagrammatic structure of medusa with more than one-quarter of the umbrella and manubrium cut away.

# Metagenesis-in life cycle of *Obelia* sp.

- Life History of *Obelia* sp. includes both asexual and sexual generations that alternate with each other to complete the life cycle.
- The germ cells originate in the ectoderm of the manubrium quite early when the medusa itself remains attached to the blastostyle
- When the gonads are ripe, ectodermal covering ruptures and the germ cells are shed in water. The ova are large rounded cells. The sperms are minute, actively swimming flagellated cells. The medusae die soon after liberating the gametes.
- Fertilization occurs either in the sea water where the germ cells are set free, or the spermatozoa may be carried by water currents to the female medusae and fertilize the ova in situ. Zygote formed after fertilization, immediately undergoes cleavage.
- The cleavage is holoblastic and a blastula is formed.

# Metagenesis-in life cycle of *Obelia* sp.

- By invagination the blastula is converted into an oval, ciliated planula larva.
- The planula consists of an outer layer of ciliated ectoderm and an inner mass of endoderm cells enclosing a space, the rudiment of coelenteron.
- The planula swims freely for a brief period and settles down on some submerged substratum by one end.
- The proximal end gradually narrows down and a disc appears for attachment. The distal end expands and by developing a manubrium and a circlet of tentacles, it turns to a hydrula or simple polyp.
- The hydrula sends out lateral buds and, by a repetition of this process, it is converted into a complex obelia colony.

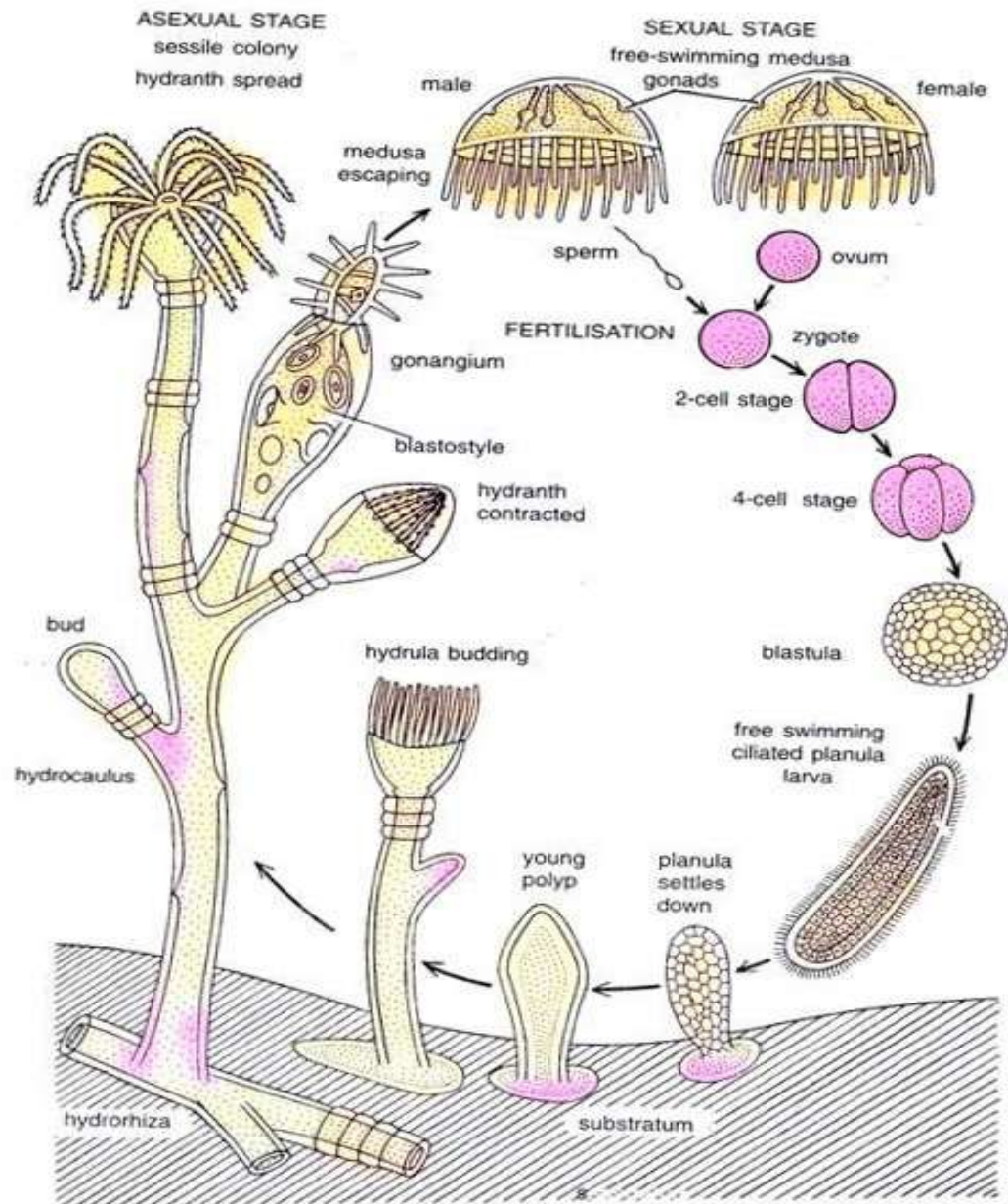


Fig. 32.11. *Obelia*. Stages in the development and life history.



# Alternation of Generations of *Obelia sp.*

- A distinct alternation of generations or metagenesis is present in the life history of *Obelia*. The *Obelia* colony is sexless, bears no gonads and develops by asexual process, i.e. by repeated budding of the hydrula.
- But the medusae buds, some of the zooids of the colony, develop gonads and, from their fertilized egg, new *Obelia* colony arises. The asexual generation is dependent on, and is alternated by the sexual generation.
- *Obelia* is a permanently fixed colony but the planula larvae it produces are free swimming. Thus, a non-locomotory species becomes locomotory.

Thank you..