

TOPIC:OBELIA:MORPHOLOGY AND LIFE

HISTORY-I

LECTURE NO:13

B.SC PART 1

ZOOLOGY(HONS.)-PAPER I-GROUP A

CHAPTER 5

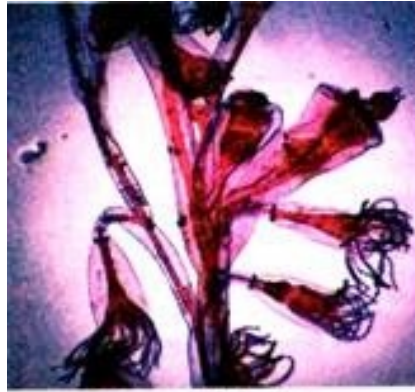
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Obelia: Habitat, Structure and Diagram

Habit and Habitat of Obelia:

Obelia is sedentary, marine colonial form found attached on the surface of sea weeds, molluscan shells, rocks and wooden piles in shallow water up to 80 metres in depth. Obelia is cosmopolitan in distribution, forming a whitish or light-brown plant-like fur in the sea; hence, the common name sea-fur is assigned to it.

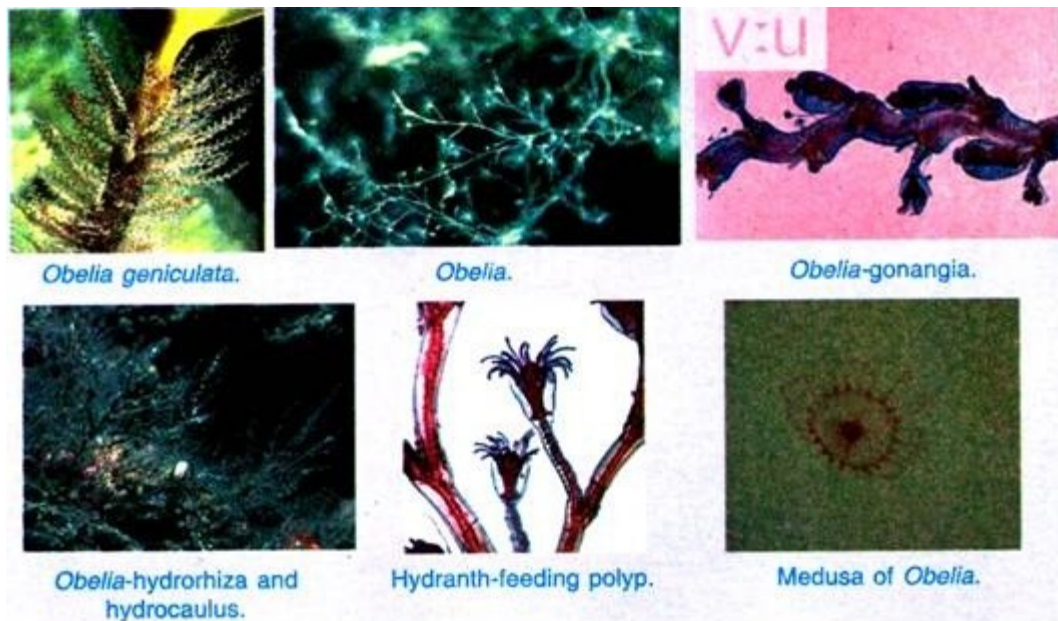


Sea fur (*Obelia*).

Obelia Colony – A Gross Structure:

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. At the growing ends of the main branches are immature club-shaped polyps. 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 polyps, their tubular connections and blastostyles are made of ectoderm, mesogloea and endoderm, these layers are together called coenosarc and its cavity is an enteron which is continuous and common to all the members, through the enteron digested food is distributed in solution.

The entire colony is covered by a tough, yellow chitin secreted by the ectoderm, this covering is known as perisarc. The perisarc constitutes the exoskeleton and it covers the hydrorhiza, hydrocauli and their branches, and at the base of each polyp, it forms a clear, wine glass-shaped hydro theca.

The hydrotheca has a shelf across the base which supports the hydranth, and the hydranth can contract and withdraw into the hydrotheca.

The perisarc around a blastostyle is a gonotheca, the blastostyle and gonotheca are together called a gonangium. The perisarc is an

exoskeleton, at first it is continuous with the coenosarc but on growing thick, it separates and is joined to the coenosarc only at intervals by minute projections, at these places it gets ringed which allows bending.

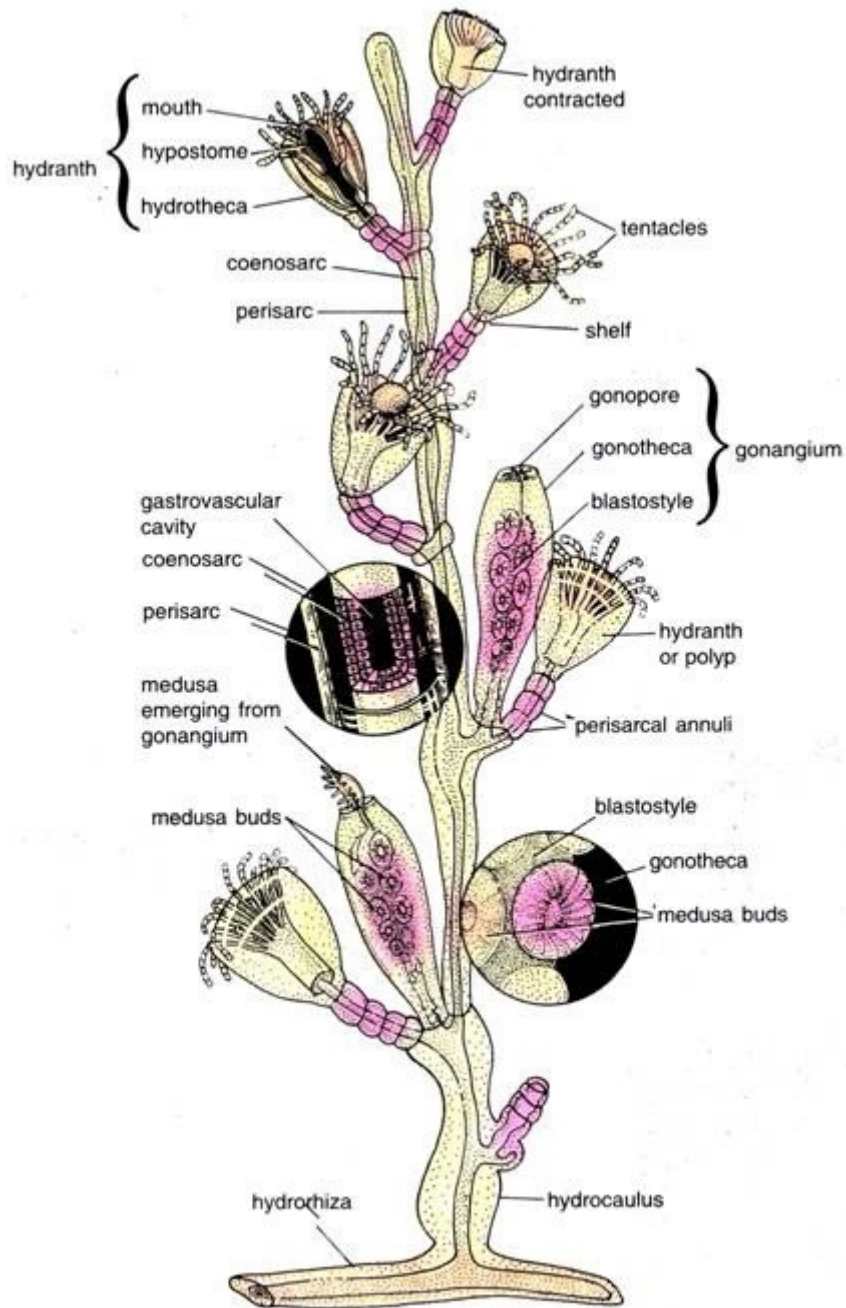


Fig. 32.1. *Obelia*. A portion of colony.

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).

In fact, to start with Obelia is a monomorphic form having polyp only but later due to the development of blastostyle it becomes a dimorphic colony and finally medusae bud over the blastostyle in a mature colony, then it becomes a trimorphic colony.

Polyp or Hydranth:

The colony of Obelia has many polyps (Gr., polypus – many-footed) or hydranths (Gr., hydra = water serpent; anthos = flower) or gastro zooids. Each polyp is very much like a miniature Hydra. It has a cylindrical body attached to the axis of the hydrocaulus by its proximal end and free at its distal end. It is covered by a cup-shaped hydro theca.

The free distal end is produced into a conical elevation, the hypostome or manubrium which is about one-third of the length of the hydranth. The hypostome is surrounded by a circle of numerous (about 24) tentacles. The tentacles are longer than hypostome, tapering and filiform.

The apex of the hypostome bears a terminal aperture called mouth which is capable of great dilation and contraction.

Below the hypostome is the stomach region of the polyp. The body and manubrium of the polyp enclose a spacious enteric cavity or gastro vascular cavity. The polyp is protected in hydrotheca, which is prolongation of the perisarc. At the base of the polyp, it forms ring-like horizontal shelf at which the polyp rests.

Histology of Polyp or Hydranth:

The polyps have an outer layer of ectoderm and an inner layer of endoderm, between them is a thin, transparent mesogloea; all these layers constitute the coenosarc which is soft and tubular, the continuous cavity is the enteron or gastro vascular cavity.

The enteron has a fluid and its lining is flagellated. Rhythmical contractions of the hydranths cause a current which distributes food obtained by some polyps to those parts of the colony where feeding is not taking place. The tentacles of polyps are solid with no enteron. They have a single-layered core of vacuolated endoderm cells with thick walls inside a layer of ectoderm.

Ectoderm:

It consists of long, conical columnar epitheliomuscular cells, their inner ends are produced into muscular processes which run longitudinally. In the ectoderm layer are very few interstitial cells, some branching nerve cells and cnidoblasts with nematocysts.

The nematocysts are abundant on the tentacles and manubrium only.

The cnidoblasts are found in the basal part of the hydranth and in the coenosarc. They form nematocyst and migrate actively to reach their final positions. Obelia has only one kind of nematocysts called basitrichous isorhizas in which the capsule is oval, but is absent, the thread is open at the tip and has spines on its base.

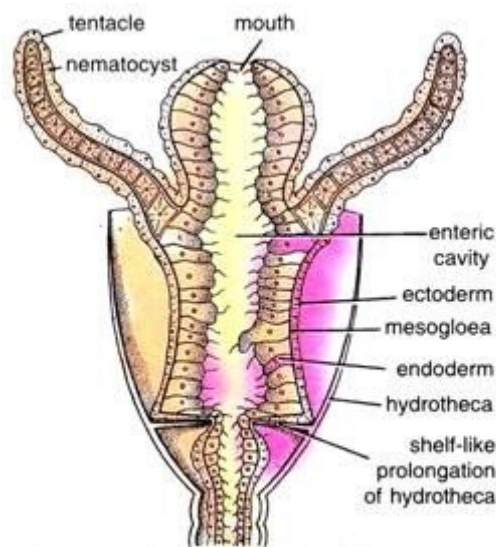


Fig. 32.2. *Obelia*. V.S. of a polyp or hydranth.

Endoderm:

It has long, granular epitheliomuscular cells, their muscle processes point outwards and are circular. Endoderm cells have flagella which produce a current in the enteron. They can also form pseudopodia for engulfing food. The endoderm of tentacles has cubical, vacuolated cells with thick walls.

In the endoderm layer are nerve cells and club-shaped gland cells which produce digestive enzymes. Mesogloea is a thin jelly-like substance with no structure or cells. On each side of the mesogloea is a nerve net composed of nerve cells and their fibres, the two nerve nets are inter-connected.

Polyp is the nutritive zooid of the colony. It is carnivorous and feeds upon aquatic crustaceans, nematodes and other worms. Tentacles help in catching and conveying the prey to the mouth. Digestive juice is secreted in the gland cells of gastro dermis and the process of digestion is extracellular as well as intracellular.

Gonangium:

The gonangium (Gr., gonos = seed; angeion = vessel) (Fig. 32.3) is club-shaped, cylindrical form. It is covered by a transparent gonotheca and contains an axis or blastostyle on which lateral buds form that develop into medusae or gonophores. The blastostyle has no mouth and no tentacles, but ends distally into a flattened disc.

The gonotheca opens at its distal end by a gonopore, through which the medusae escape. Gonotheca, blastostyle and the gonophores together form a gonangium.

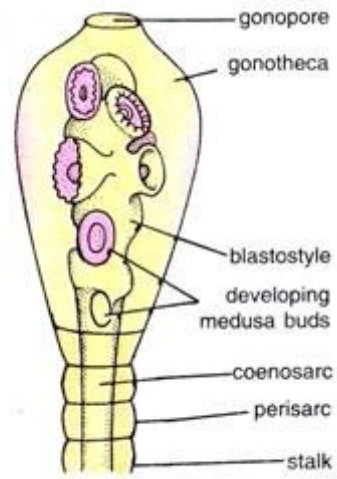


Fig. 32.3. *Obelia*. A gonangium.