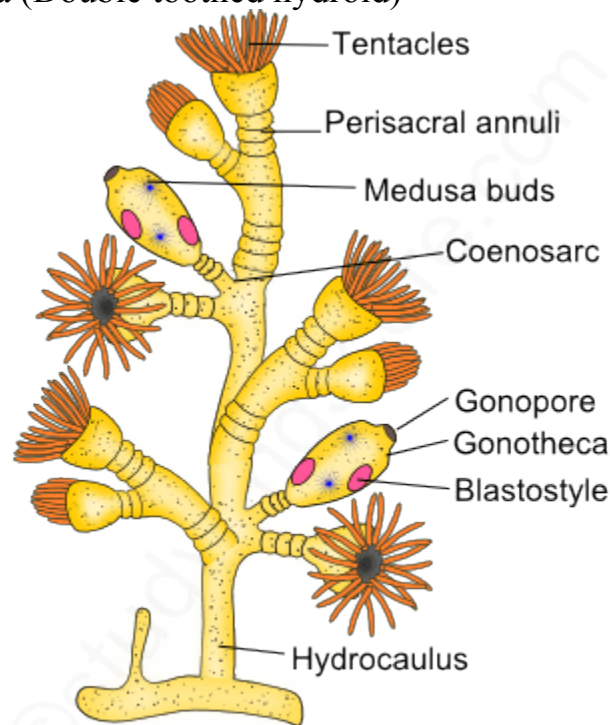


Obelia (Sea Fur)

INTRODUCTION

- Obelia is a sedentary colonial marine cnidarian which grows upright in a branching tree-like form and has several specialized feeding and reproductive polyps.
- It is commonly called sea-fur
- It exists in both asexual, sessile, polypoid stage and sexual, free-swimming medusoid phase.
- The common species of Obelia are:
 - a) *Obelia geniculata* (Knotted thread hydroid)
 - b) *Obelia longissima* (Sessile hydroid)
 - c) *Obelia dichotoma* (Sea thread hydroid)
 - d) *Obelia bidentata* (Double toothed hydroid)



OBELIA-PART OF HYDROID COLONY

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HABIT AND HABITAT:

- Obelia is cosmopolitan in distribution, only exception being the high-arctic and Antarctic seas.
- They grow in shallow water, in intertidal rock pools and are usually found up to 80-100 meters of depth from the water's surface.
- The medusa stage of Obelia species is commonly found in coastal and offshore plankton around the world.
- The colonies of Obelia are often found as a delicate fur-like growth on the rocks, stones, mollusc shells, sea weeds, wooden pilings and wharves.
- *Obelia geniculata* normally grows on kelp fronds,

MORPHOLOGY

- Obelia is a very small marine hydroid.
- It looks like a small branching tree exhibiting whitish or brown colour.
- The height of Obelia varies from 2 cm or more.
- The body of Obelia consists of two kinds of filaments, horizontal hydrorhiza and vertical hydrocaulus. Fig. : Colony of Obelia geniculata

A. Hydrorhiza (Root of a hydroid)

- Hydrorhiza is the basal part of the colony consisting of tubular processes called stolons.
- It encrusts over the surface of substratum and helps in the attachment of the colony.

B. Hydrocaulus (Stem of a hydroid)

- A few small vertical filaments, 2-3 cm long, arise from the hydrorhizas. These are called hydrocauli (Sing., Hydrocaulus).
- Each hydrocaulus branches alternately, each of which terminates into a polyp. The polyps collectively are termed as zooids.
- These zooids are nutritive in function and help in feeding. These are called gastrozooids.
- The axils of proximal branches bear cylindrical reproductive zooids. These are termed as gonozooids, blastozooids or blastostyles.

LIVING TISSUE OF OBELIA - COENOSARC

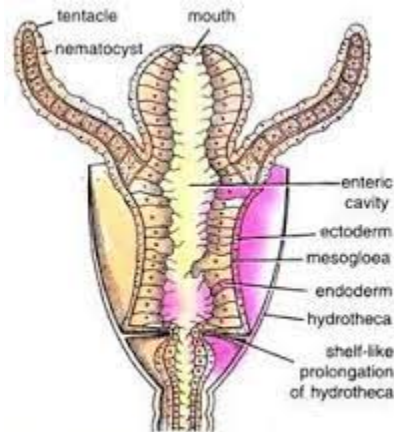


Fig. 32.2. Obelia. V.S. of a polyp or hydranth.

- Whole colony of Obelia; hydrorhiza, hydrocaulus and zooids; contain living tissue, called coenenchyme or coenosarc.
- The coenosarc is diploblastic comprising of two layers;
 - outer epidermis
 - and inner, gastrodermis.
 - A middle non-cellular layer of mesoglea is present in between epidermis and gastrodermis.
- A narrow canal, called coenosarc canal runs through whole colony of Obelia which is continuous with the gastrovascular cavity of the zooids.
- The continuity of the canal system helps to transport the digested food throughout the colony.

A. EPIDERMIS

- The epidermis is thin and made up of typical cells of Cnidaria. These include; epithelio-muscular cells, mucus-secreting cells, interstitial cells, nerve cells and nematoblasts.
- The nematocysts are basitrichous isorhizas. These consist of an oval capsule, a long thread bearing spines and open at the tip.

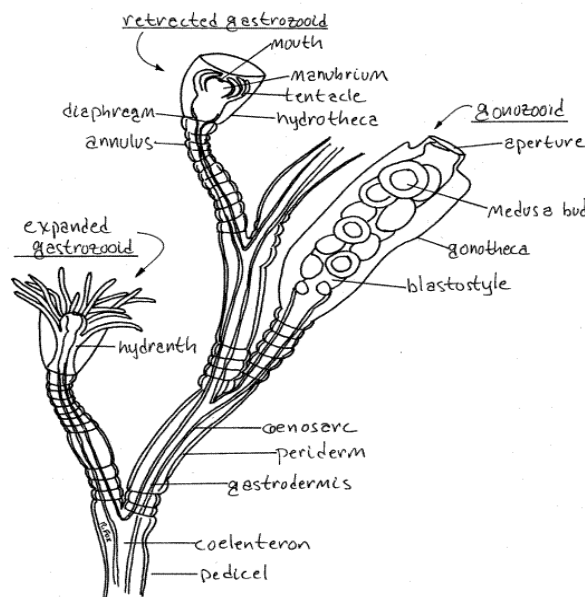
B. GASTRODERMIS:

- It forms the lining of gastrovascular cavity and consists of endothelio-muscular cells, nutritive cells, gland cells and nerve cells.

C. PROTECTIVE COVERING –PERISARC

- Entire colony of Obelia is surrounded by a protective covering, called perisarc.
- It is noncellular, tough, transparent, yellowish-brown and cuticular in nature and is called perisarc or periderm.
- It makes the vertical part of the colony firm and rigid. Perisarc is secreted by the epidermis and is separated from the coenosarc by a thin fluid-filled space.
- However, the coenosarc and perisarc are in contact making the colony more rigid.
- At some points, the perisarc is arranged in flexible rings called annuli. These allow the swaying movements due to the force of water currents.
- The perisarc of hydranth is termed as hydrotheca and that of gonozooid is called gonotheca.

MORPHOLOGY OF A GASTROZOOID



- Gastrozooid of Obelia is a feeding polyp.
- Its function is to feed the whole colony.
- Gastrozooid is a tubular and diploblastic zooid with a central gastrovascular cavity continuous with the coenosarc canal.
- The polyp is attached to the hydrocaulus by a hollow stalk while its distal end is produced into a conical elevation called manubrium or hypostome.
- The apical portion of the manubrium bears a terminal mouth encircled by numerous long, solid tentacles, often 24, loaded with nematoblasts.

- The perisarc of gastrozoid, called hydrotheca, is transparent and cup-shaped invaginated as a platform or shelf at the base of the gastrozooids for polyp to rest.
- The gastrozoid and hydrotheca collectively form hydranth.
- In case of any emergent situation, the polyp can withdraw itself into the hydrotheca and the tentacles fold over the manubrium covering the mouth.
- The presence of shelf prevents the polyp to retract into the hydrocaulus.
- The annuli of the perisarc present around the stalk of polyp allow the swaying movements due to the force of water current.

MORPHOLOGY OF A GONOOZOID (Polyp stage)

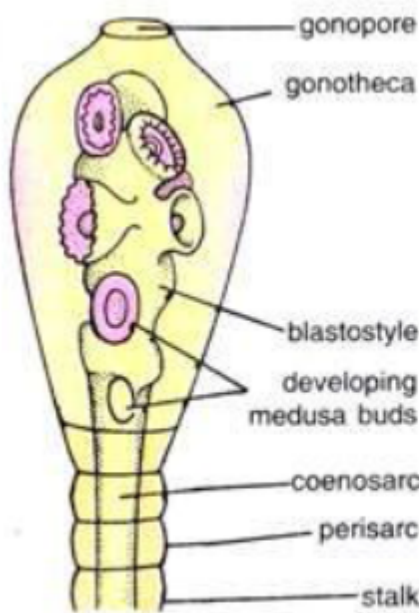


Fig. 32.3. *Obelia*. A gonangium.

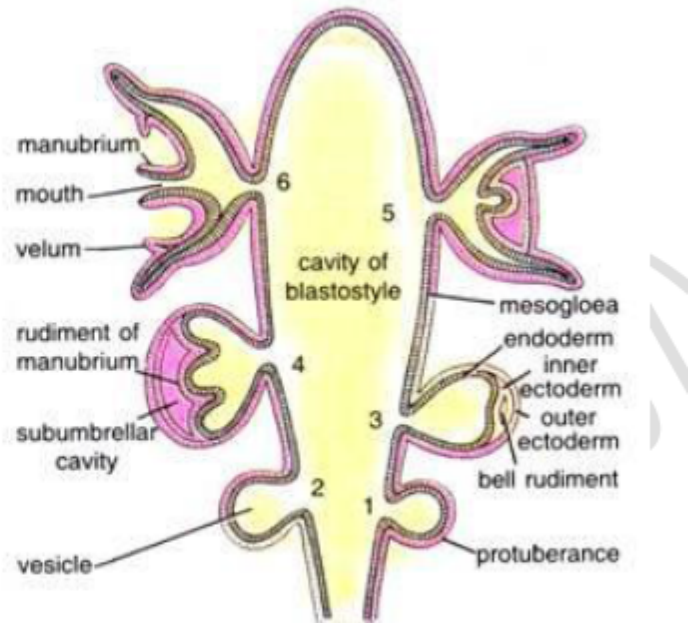


Fig. 32.8. *Obelia*. Stages of the development of medusa from a blastostyle.

- The gonozooids, also called blastozooids or blastostyles are cylindrical rod-like reproductive bodies present in the axils of hydrocaulus and stalk of gastrozooids.
- Gonozooids are less in number than gastrozooids as these are present only in the proximal part of the colony.
- It has a reduced gastrovascular cavity and is devoid of mouth and tentacles.
- It, thus, cannot feed and receives food digested by the gastrozooids and transported through the gastrovascular cavity.
- Like other parts of the colony, gonozooids are also enclosed in a perisarc, called gonotheca. It is constricted distally and constricted by annuli proximally.
- The apical part of the gonotheca has an opening called gonopore.
- Gonozooid produces numerous small medusae or gonophores by the asexual process of budding.
- Mature medusae detach from the gonozooids and escape into the surrounding water through the gonopore.
- The gonozooids, gonophores and gonotheca collectively form gonangium.

MORPHOLOGY OF A MEDUSA

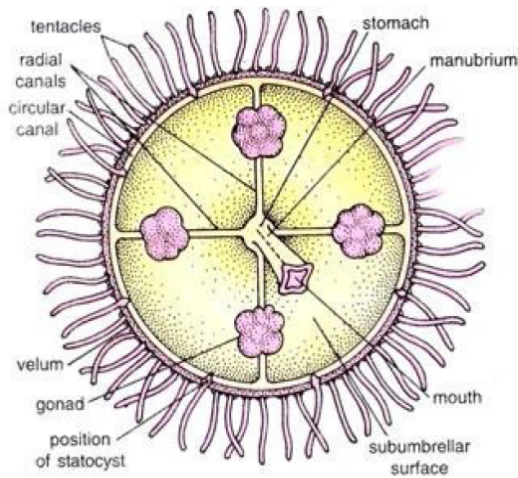


Fig. 32.4. *Obelia*. Medusa in oral view.

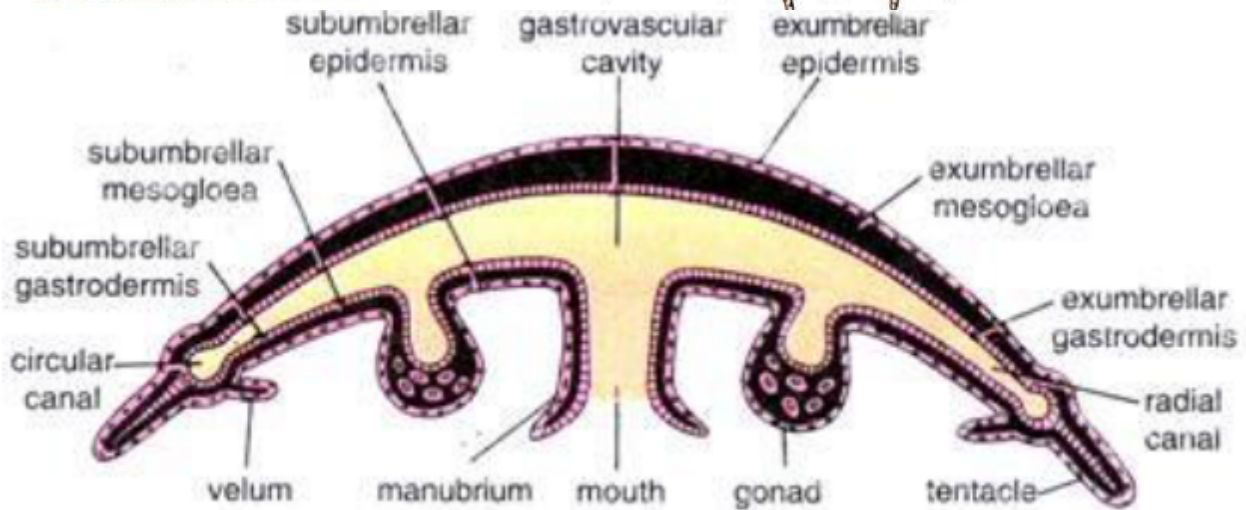
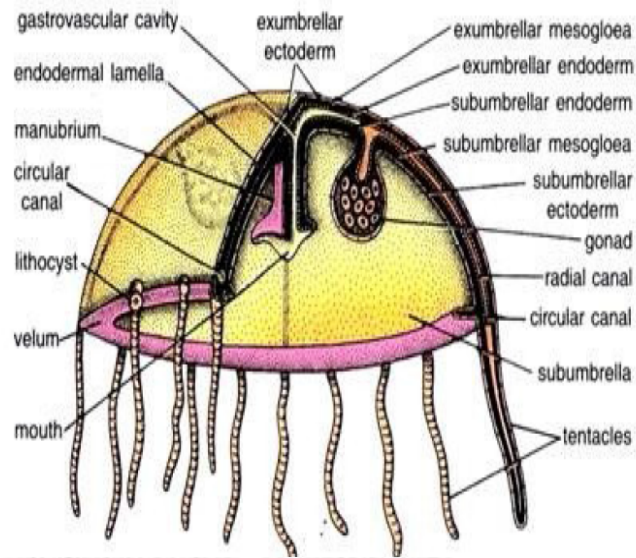


Fig. 32.10. *Obelia*. V.S. of medusa showing gonads.

- Medusa of *Obelia* is radially symmetrical, umbrella-like zooid which measures approximately 6-7 mm in diameter.
- The outer surface of medusa is convex and known as ex-umbrellar surface, while the inner concave surface is called sub-umbrellar surface.
- A short manubrium containing a quadrangular mouth at its distal end hangs from the centre of the sub-umbrellar surface.
- The medusa is craspedote type as its edge is produced inwards into an insignificant rudimentary velum.
- The margins of the medusa bear initially 16 short, contractile tentacles; which gradually increase in number.
- The mouth opens into a short gullet which leads to a wide expanded stomach from which arise four narrow, radial canals which mark the four principal per-radii.
- The radial canals extend till the margin of the umbrella and open into a circular canal running parallel to the margin.

- The radius bisecting two per-radii is called inter-radius (four in number) and that bisecting per-radius and adjacent inter-radius is termed as ad-radius (eight numbers).
- The tentacles present at the end of these radii are named accordingly, such as per-radial tentacles; inter-radial tentacles and so on.
- Whole system of canals is lined by inner layer of gastrodermis and both the ex-umbrellar and sub-umbrellar surfaces are covered by epidermis.
- Nervous system consists of two diffused nerve nets which are concentrated around the margins of the umbrella and form two circular nerve rings.
- Eight receptor organs, called statocysts, are present at the bases of ad-radial tentacles. These are the organs of balance, muscular co-ordination and equilibrium.
- Medusa possesses four gonads on the sub-umbrellar surface.
- These are per-radial in position and each of these is present in the middle of each radial canal.
- These are dioecious, male and female medusae being separate individuals.