DAUDNAGAR COLLEGE

MAGADH UNIVERSITY

Topic

PHYLUM – CNIDARIA

AURELIA

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Aurelia aurita

Classification:

Phylum: Coelentrata

Class: Scyphozoa

Order: Semaeostomae

Genus: *Aurelia*

Species: *aurita*

Distribution

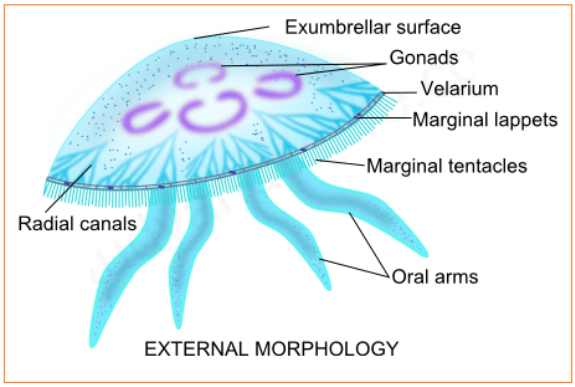
- The genus Aurelia is found throughout most of the world's oceans.
- The species *Aurelia aurita* is found along the **eastern Atlantic coast** of Northern Europe and the western Atlantic coast of North America in New England and Eastern Canada.

Habit and Habitat

- *Aurelia aurita* is also known as **moon-jelly** or **jelly fish**.
- It is found in **warm and temperate seas** all over the world. It is an inshore genus.
- Found either floating with water currents or feely swimming by the contraction movements of **its bell**.
- It is **carnivorous** and **feeds on small animals** with the help of its oral arms.
- It responds to various stimuli and is most active in diffuse light.

External morphology

Jelly fish is not a true fish. It is called jelly fish due to its jelly like structure and its floating habit like fishes.



EXTERNAL MORPHOLOGY

- **Shape and size:**
  - Aurelia has its **soft umbrella shaped body** with <u>four red or purple horseshoe shaped gonads</u> on its upper surface and four long and narrow <u>oral lobes hanging downwards</u> from the lower surface.
  - It has a <u>convex aboral or ex-umbrellar</u> surface and a concave oral or subumbrellar surface.
  - The body of *Aurelia sp.* is transparent and bluish white in colour.
- **Mouth and oral arms:**
  - The center of the subumbrellar surface bears a short and inconspicuous manubrium.
  - At the distal end of the manubrium is situated a square mouth.

- And from the each corner of the square mouth, long tapering frilled, delicate processes called **oral arms** hang downwards. These arms have **ciliated grooves** which lead into the mouth.
- Also the **edges of the grooves consist of nematocysts**.
- The radii along which the oral arms lie are called **perradii**.
- Midway between the two perradii an interradius is present. And finally between each perradius and interradius an adradius is present.

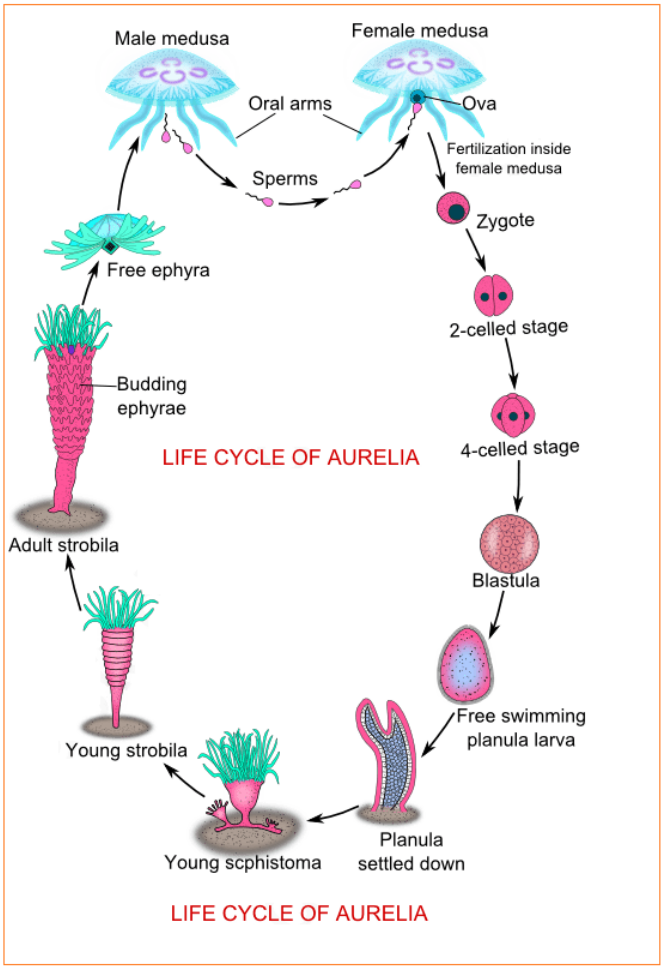
- **Sub genital pits:** Each of the inter-radius bears a circular aperture on the subumbrellar surface, which leads into small cavity called as **sub genital pit.**
- **Gonads:** Just above the genital pit, **horseshoe shaped gonads are present**. The gonads are red or purple in colour. The free arms of all the gonads are directed towards the center of the umbrella. There is no connection between the genital pit and the gonads.
- **Lappets:** The circular margin of umbrella is broken into 8 lobes by 8 notches.
  - Each of the notches has two delicate leaf-like processes called as **marginal lappets**.
  - Between these lappets a small secretory organ is present called as **tentaculocyst or rhopalium**.

- **Marginal tentacles:** Between the notches, the **free edge of the umbrella** is surrounded by a row of numerous small delicate thread-like structures called as **marginal tentacles**.
  These **tentacles have batteries of nematocysts.**
- **Velarium:** The margin of the subumbrellar surface bearing lappets and tentacles forms a thin flexible flap called **velarium.**
  - The **velarium in Aurelia do not have gastrodermal canals** running into it and so it is called **pseudovelum**.
  - The medusa form with such pseudovelum is called as **acraspedote**. (This **differs from the velum of the Obelia** which has gastrodermal canals running into it and called **crespedote.** The **velum of Obelia is a true velum**. The medusa form with true velum is called as **craspedote** medusa.)

LIFE CYCLE

- **Strucutre:** Aurelia is **dioecious species**, i.e. male and female sexes are separate but there is no sexual dimorphism. Testes and ovaries are similar in appearance.
  - The **medusa form** has **four horseshoe shaped gonads** on the floor of the stomach.
  - The gonads are red or purple in colour. The free arms of all the gonads are directed towards the center of the umbrella.
  - The gonads are clearly visible through the semitransparent body of the jelly fish.
  - On maturity ova and sperms break into the gastro vascular cavity and pass out of the mouth with the outgoing water current.
  - These eggs and sperms are loaded in the frills of the oral arms.

- **Fertilization:** The spermatozoa after being **released from the body** through the outgoing water current swim about till it reached the ova.
    - The **ova are fertilized in the stomach of the female** or also in the **oral arms**.
    - Thus the fertilization in Aurelia is said to be **internal or external both**, depending on location.



- **Formation of planula larva:** The frills of the oral arms serve for temporary brooding. In these frills the zygote undergoes early development and forms ciliated larval stage called as **planula larva**.
    - The zygote undergoes holoblastic divisions to produce solid ball like morula.
    - The morula is transformed into **single layered blastula** with a fluid filled cavity called as **blastocoel**.
    - A **two layered gastrula** is developed by the **invagination**. Gastrula has an **inner endoderm and an outer ectoderm.**
    - **The blastopore of the gastrula is not completely closed**.
    - The embryo now elongates and its outer cells become ciliated and finally the **blastopore closed**. This **ciliated larva** is called as **planula larva**.
- **Formation of scyphistoma:** The **ciliated planula larva** after a short free-swimming existence **attaches itself to a substratum** by its **aboral end**.
    - After the attachment the **cilia of the larva are lost** and a **mouth opens at the oral end**.
    - The **larva now elongates** and gets **metamorphosed** into a small **trumpet shaped polyp**.
    - **Tentacles develop around the mouth**.
    - Mouth becomes square in outline and its edges become elongated to form a short manubrium.
    - Now the larva looks like a **trumpet-shaped hydra** and is called as **hydratuba** or **young scyphistoma**.
    - Scyphistoma **feeds and grows in size and survives** in this stage for several months.
    - It also shows **budding** and the buds eventually separate from the parent.

- **Formation of ephyrae:** The formation of ephyrae from the scyphistoma is called as the **process of strobilation**.
    - **In autumn and winter**, scyphistoma undergoes strobilation.
    - The scyphistoma distally develops a series of ring-like transverse constrictions. These constrictions gradually deepen and the organism now resembles a pile of minute discs placed one above other.
    - At this stage, the scyphistoma with the segmented body is called as **strobili** and each of the segments is called as **ephyra larva**.
    - The ephyrae are connected with one another by muscular strands.
    - As the ephyrae grow the muscular strands break at intervals and then the ephyrae are pinched off one by one.
    - **These pinched ephyrae swim away as little jelly-fish**.
    - When is abundant, and temperature is low several ephyrae are released at a time and this is called as **polydisc strobilation** .
    - Whereas, when the food is limited and the temperature is high only a single ephyra is released at a time. This is called as **monodisc strobilation**.
- **Ephyra:** A newly released ephyra is microscopic and gelatinous creature. This creature has a **well-developed tetramerous symmetry**.
    - The edge of its umbrella body has **eight bifid lobes** separated by eight deep adradial indentations or clefts.
    - The distal ends of each lobe are deeply notched to form a pair of lappets which are sensory in nature.
    - The space between the two lappets has a short tentacle which is the future **tentaculocyst**.
    - Ephyra also possess manubrium and a four edged mouth. Ephyra swims actively in sea water and feed on small organisms like protozoans.
    - The lappets help in catching the prey and transferring the prey to the mouth.
- **Metamorphosis:** As the growth proceeds, the mesogloea increases enormously and the two layers of the endoderm fuse to form a solid gastrodermal lamella except in the regions of the gastro vascular canals. With the appearance of numerous marginal tentacles **and four oral arms ephyra is finally transformed into adult Aurelia**.

RIVISION QUESTIONS:

1. Discuss the process of fertilization in Aurelia.
2. Draw a neat labelled diagram of the life cycle of Aurelia.
3. Explain the formation of Planula larva.
4. What is Ephyra?
5. Write about the size and shape of Aurelia.
6. What are Lappets and what is their use?
7. Write few points about velarium.