

# Polymorphism in Hydrozoa

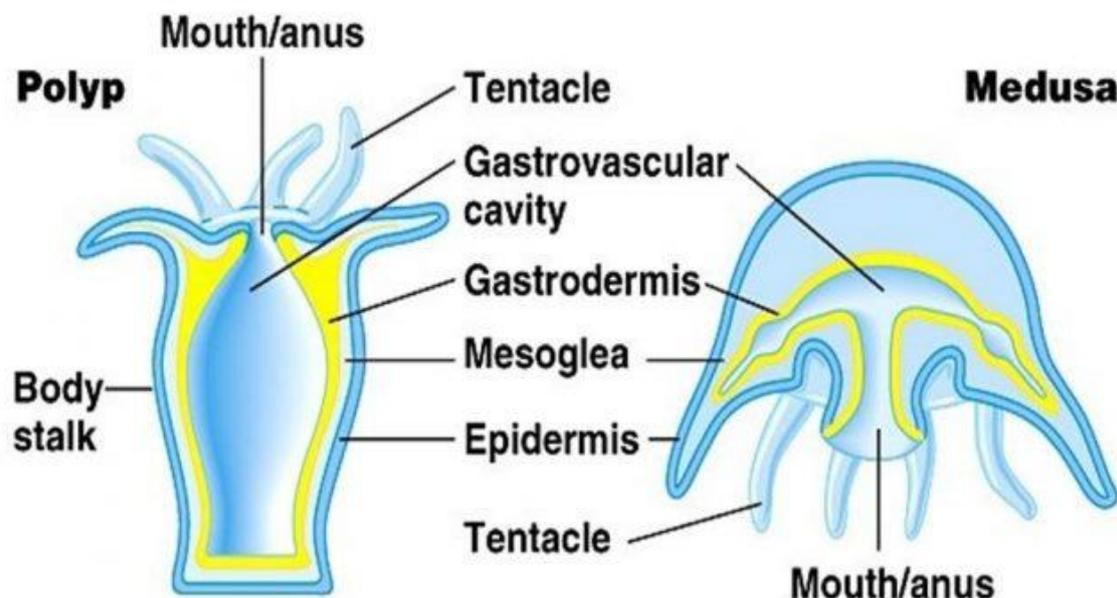
B.Sc. Part -I, Paper -I

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The occurrence of more than one type of structurally and functionally different individuals within a population is called polymorphism. The class Hydrozoa of phylum Coelenterata includes a large number of colonial species that contain more than one form of individuals which are called zooids.

Coelenterates have two basic zooids, polyp and medusa. All other types of zooids are modifications of these two types of zooids.

## Polymorphic form in Coelenterata: two types of zooids



Coelenterates which may be single or colonial, they exist in two forms- polyps and medusa

**1. Polyp:**

- In Hydrozoa, polyps have a tubular body with a mouth surrounded by tentacles at one end. Another end is blind and usually attached to pedal disc to the substratum
- Polyps are generally sessile
- They reproduce asexually

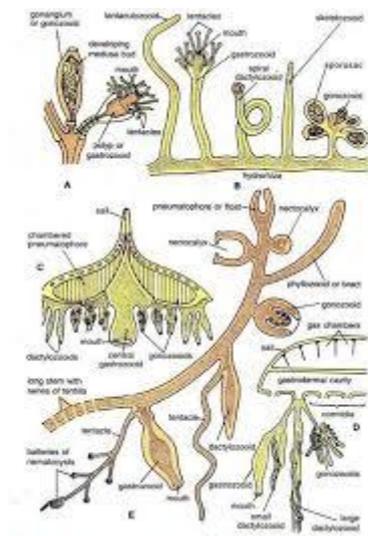
**2. Medusa:**

- In Hydrozoa, medusa has a bowl or umbrella shaped body with marginal tentacles and mouth centrally located on a projection called manubrium of the lower concave surface.
- Medusas are generally motile
- They reproduce sexually

**Importance of polymorphism:**

- It is essential for division of labour among the individual zooids.
- Different functions are assigned to different forms. For examples; polyps are concerned with feeding, protection and asexual reproduction whereas medusa is concerned with sexual reproduction.

**Patterns of polymorphism in Hydrozoa:**



Degree of polymorphism varies greatly in different group of Hydrozoa.

**1. Dimorphic:**

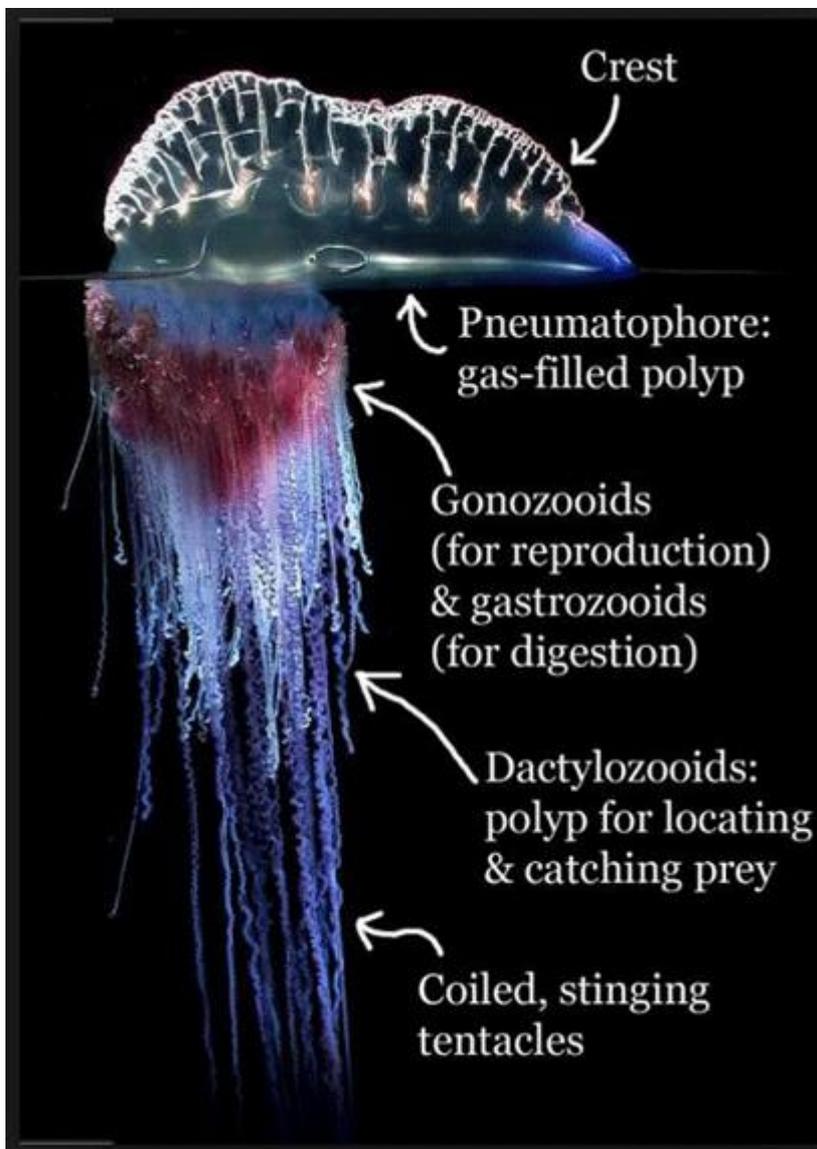
- It is simplest and commonest pattern of polymorphism
- They have only two types of zooids (gastrozooids and gonozooids) and the phenomenon is known as dimorphism.
- Exhibits by many Hydrozoan colonies
- Examples: *Obelia*, *Tubularia*

**2. Trimorphic:**

- They have three types of zooids- gastrozooids, gonozooids and dactylozooids.
- Gastrozooids is responsible for feeding and asexual reproduction
- Similarly, gonozooids is responsible for sexual reproduction
- Dactylozooids is functionally non-feeding form and is responsible for defence.

### 3. Polymorphic

- Some coelenterate has more than three forms called polymorphism
- In *Hydractinian*, five polymorphic form or zooids exists- gastrozooids, spiral dactylozooids, tentaculozooids, skeletozooids and gonozooids.
- Gastrozooids: responsible for feeding
- Spiral dactylozooids: responsible for protection
- Tentaculozooids: responsible for sensory impulse
- Skeletozooids: responsible for spiny projections
- Gonozooids: responsible for sexual reproduction



## Physalia

- **ORIGIN OF POLYMORPHISM**

- There are many theories to explain the origin of polymorphism in coelenterates.

- **Polyorgan theory:** This theory was proposed by Huxley (1859), Eschscholtz (1829), E. Metschnikoff (1874) and Muller (1871), according to which individuals of a colony are actually organs of a medusoid individual, which have multiplied and migrated from their primitive positions to the current evolved positions.

- **Polyperson theory:** This theory was first proposed by Leuckart (1851), Vogt (1848), Gegenbaur (1854), Kolliker (1853), Claus (1863) and later strongly supported by E. Haeckel (1888), Balfour (1885) and Sedgewick (1888). According to this theory colony is not a single individual but various parts of the colony are modified individuals which have changed their structure due to division of labour. They have all modified from the primitive zooid which was a polyp.

- **Medusoid theory:** This theory was proposed by Haeckel (1888) as a compromise between the above theories. The theory says that the siphonophore larva formed from gastrula was a medusoid individual, from which zooids or persons appeared by budding from the subumbrella.

- **SIGNIFICANCE OF POLYMORPHISM**

- The phenomenon of polymorphism is essentially one of division of labour in which specific functions are assigned to different individuals. Thus, polyps are modified for feeding, protection and asexual reproduction, while medusae are concerned with sexual reproduction. This distribution of functions among diversified individuals and their subsequent modifications in coelenterates may have resulted from their initial simple organization and lack of organ specialization. Polymorphism gave the colonies competitive edge in protection and food gathering and eventual survival.