SALPA

Salpa is common free swimming pelagic urochordate found at a depth of 200 mere in all seas. It belongs to class Thaliacea,
Order - Salpida
family - Salpidae

Structure

Salpa is small, oval and transparent. The body remains covered by a gelatinous test which is completely attached to the mantle. The body is prism shaped or cylindrical and is greatly variable in length.

Salpa occurs in 2 forms
(I) Solitary or oozoid form
(II) Aggregate or blastozooid form

1. Solitary or Oozoid form :-

- It is bilateral symmetrical asexual form of Salpa with atrial and branchial aperture on opposite end of the body.
- The body is covered with thin and soft test.
- Several muscular band which are C-shaped encircle the body.

Bands are incomplete on the ventral side and the transversely gives striated appearance. anterior band surrounding the tip and when it contracts the mouth closes forcing water through the atrial aperture and thus it moves forward.

The oral aperture opens into the prebranchial part of the pharynx at the dorsal surface of which lies a tentacle or dorsal languet behind which is the peribranchial band, pharyngeal and atrial

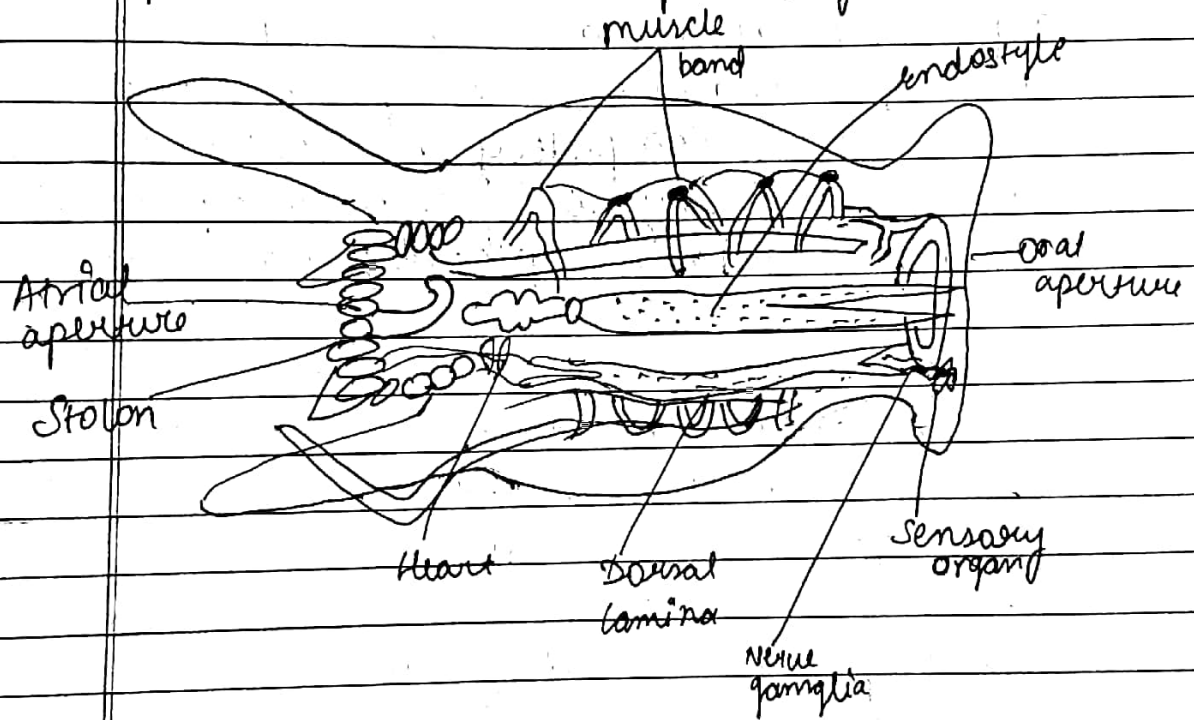


Fig :- Asexual form (oozoid) of Salpa

cavities are separated incompletely by an oblique bar. Lateral wall of pharynx are absent. A pair of aperture represent gill aperture which are separated by a median gill bar. Thus pharynx and atrium form

a large cavity. The alimentary canal behind pharynx is distinguished into oesophagus, stomach and intestine. Stomach is associated with pyloric gland which extends upto the intestine. All these structure together form nucleus of the animal. Behind endostyle b/w 5th and 6th muscular bands lies the heart.

The ganglion is situated near the anterior end of the gill. It give rise to many nerves which innervates various organs. A sense organ on the dorsal surface of the ganglion and below the ectoderm of the body in form of U-shaped pigmented ridge is known as the eye. In solitary Salpa form stolon arises from b/w the heart and endostyle.

The heart is situated near the stomach and gives rise to many important vessels leading to various organs such as the branchial sacs, test, the eye and atrial chamber.

The solitary form reproduces asexually. The stolon gets divided into segments, each of which forms the sexual blastozooids. These get detached from parent forming aggregate form.

2. Aggregate or blastozooid form :-

Each blastozoids contains gonads - one ovary and one testis. It differ from the solitary form in following characters -

(i) It is asymmetrical
(ii) Lesser number of muscular bands
(iii) Presence of gonads.
(iv) Absence of stolon 4
(v) It reproduce sexually.

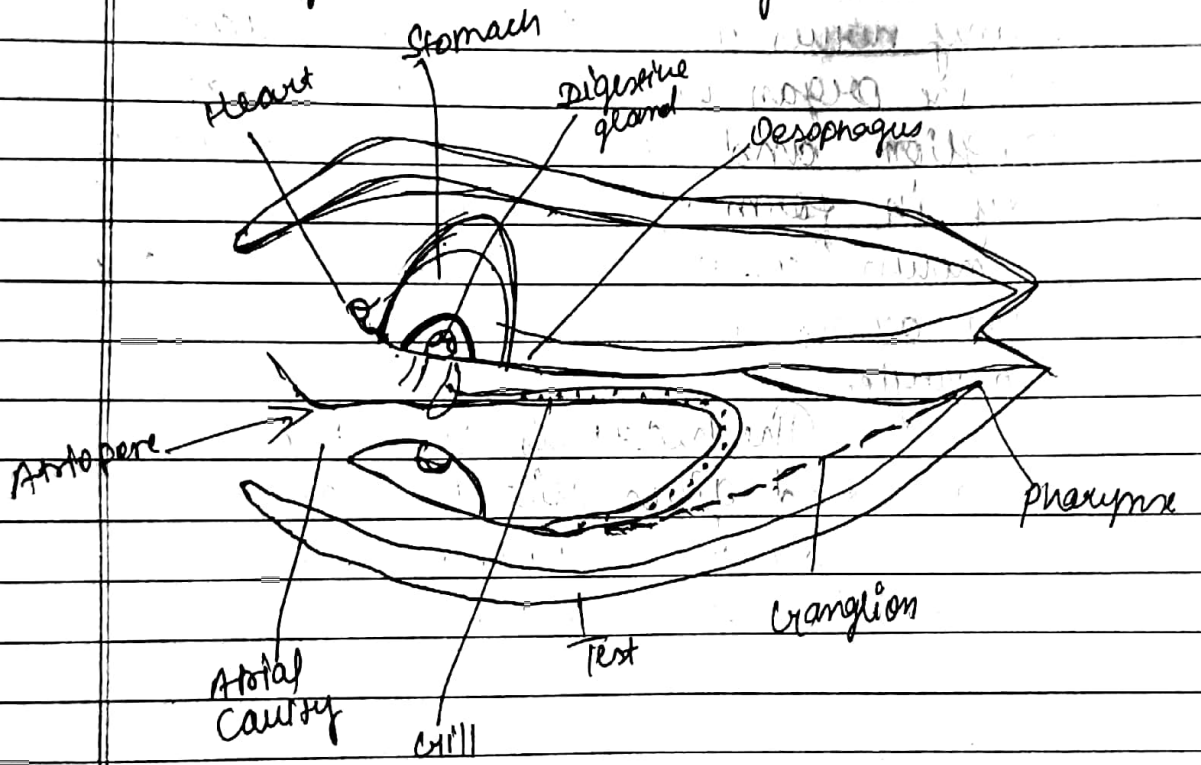


Fig :- Sexual blastozooid Salpa

Reproduction 4 alternation of generation

The salpa varies in two form during its whole life. The sexual phase (oozoid) which give rise to sexual form having both

Ovary and testis. The asexual form is solitary while sexual (blastozooid) form is gregarious. Both phases alternates with each other.

Sex organs

Salpa is protogynous i.e; ova mature first. The ova is unpaired and placed near the right side of nucleus. The oviduct is located near the junction of stalk and the atrium lie on dorsal side.

The testis is pair of tubular branched structure placed near nucleus on each side of the intestine. Each testis open in the atrium by its individual pore.

Fertilization

The fertilization is internal and the animal plays an important role. The sperms discharged by the other Salpa are sucked through the atrium and reach in its lumen where they fertilize the mature ovum. Soon after the fertilization the oviducal opening is closed and a sac like follicle for the ovum is formed by the ovarian epithelium.

Development and life cycle :-

The cleavage is holoblastic. The development

is direct and takes place within the body of the animal inside follicle formed by the atrium. The follicular cells nourish the embryo by two methods —

(a) by the formation of the placenta.
(b) by proliferation takes place in the lateral and dorsal follicular cells which later on migrate among the blastomeric and intermingle to form the gonoblastic Kalymnocytes.

The development continues gradually. The embryo escapes out by rupture of the atrial wall and lies freely in the atrial space with the only parental placental condition.

Further development and nature of various organs are not well known. But few things are very clear!-

(i) The ganglion is mesodermal in origin but later on overlapped by the ectodermal diverticulum of the pharynx.
(ii) The sub-neural glands are endodermal in origin.
(iii) The stolon develops as a diverticulum of the postero-ventral wall of the pharynx. The stolon develops a chain of 50-50 zooids.

Later on constricted part gradually atrophies & zooids remain adhere by the processes of the body wall and the test. Soon all the zooids are set free.

ENZYME-LINKED IMMUNOSORBANT ASSAY

Enzyme-linked immunosorbant assay (***ELISA***) is a non-isotopic immunoassay. An enzyme is used as a label in ELISA in place of radioactive isotope employed in RIA. ELISA is as sensitive as or even more sensitive than RIA. In addition, there is no risk of radiation hazards (as is the case with RIA) in ELISA.

Principle

ELISA is based on the ***immunochemical principles of antigen-antibody reaction***. The stages of ELISA, depicted in ***Fig.41.11***, are summarized.

1. The antibody against the protein to be determined is fixed on an inert solid such as polystyrene.

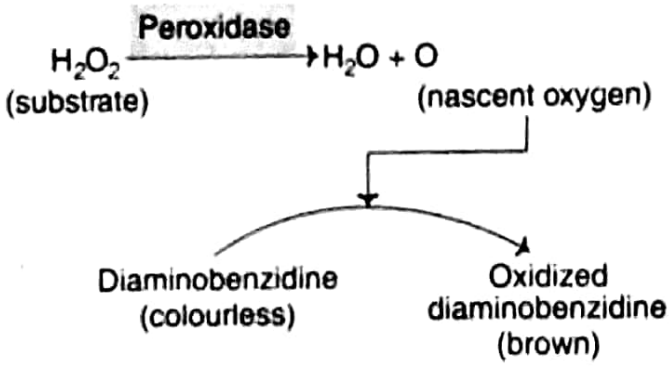
2. The biological sample containing the protein to be estimated is applied on the antibody coated surface.

3. The protein antibody complex is then reacted with a second protein specific antibody to which an enzyme is covalently linked. These enzymes must be easily assayable and produce preferably coloured products. Peroxidase, amylase and alkaline phosphatase are commonly used.

4. After washing the unbound antibody linked enzyme, the enzyme bound to the second antibody complex is assayed.

5. The enzyme activity is determined by its action on a substrate to form a product (usually coloured). This is related to the concentration of the protein being estimated.

The principle for the use of the enzyme peroxidase in ELISA is illustrated next.



Applications

ELISA is widely used for the ***determination of*** small quantities of ***proteins*** (hormones, antigens, antibodies) and other biological substances. The most commonly used pregnancy test for the detection of human chorionic gonadotropin (hCG) in urine is based on ELISA. By this test, ***pregnancy*** can be detected within few days after conception. ELISA is also been used for the diagnosis of ***AIDS***.

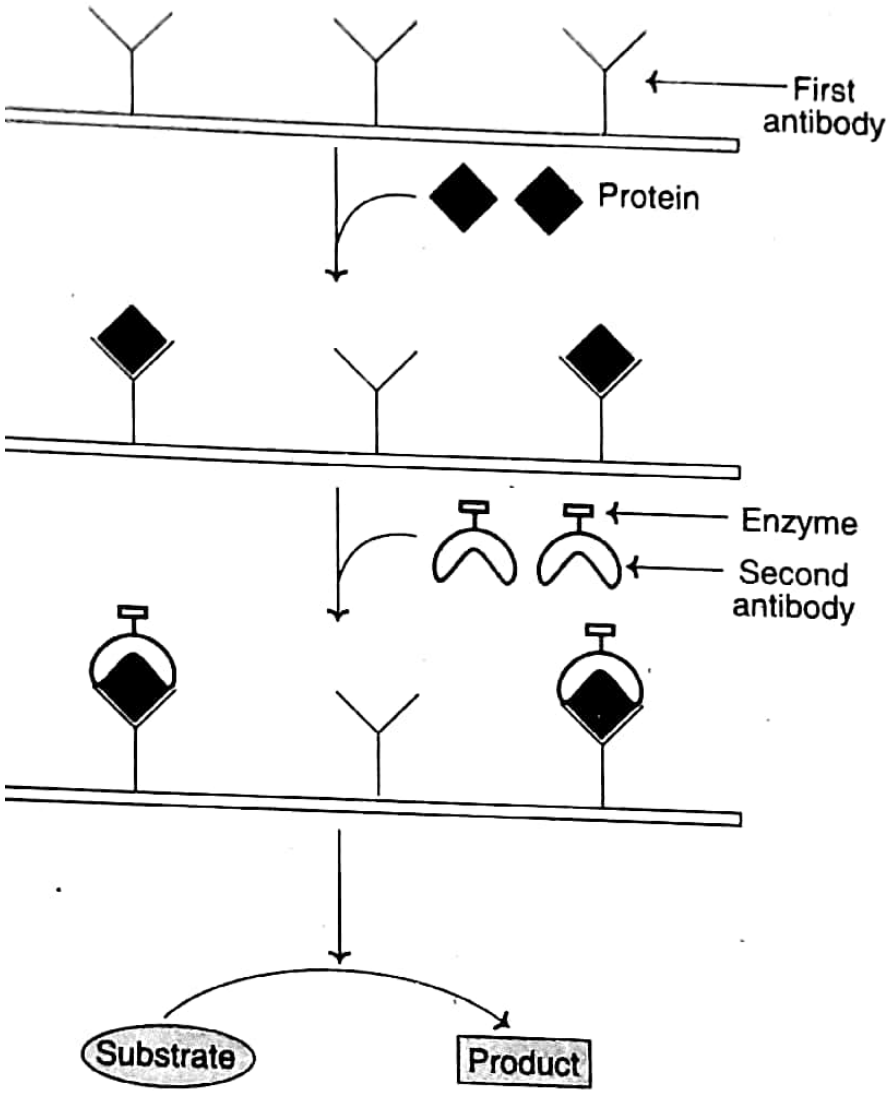


Fig. 41.11 : Diagrammatic representation of enzyme-linked immunosorbant assay (ELISA).

have the desired properties but are found with many other antibodies which undoubtedly are not required. A simple, convenient and desirable method for the large scale production of specific antibodies remained a dream for immunologists for a long period. In 1975, George Kohler and Cesar Milstein (Nobel Prize 1984) made this dream a reality. They created hybrid cells that will make unlimited quantities of antibodies with defined specificities, which are termed as ***monoclonal antibodies (McAb).*** This discovery, often referred to as hybridoma technology, has revolutionized methods for antibody production.