Course Title: Zoology Practical Paper
Course Code: ZO-113

SEMESTER I - ANIMAL DIVERSITY –I

ZO-113 Zoology Practical Paper

Internal Practical Examination

Marks - 15

ANIMAL DIVERSITY I

MUSEUM STUDY OF PHYLUM PROTOZOA

AMOEBA

Systemic Position

Kingdom Protista U nicellular Eukaryotes

Phylum Protozoa Unicellular, Primitive animals.

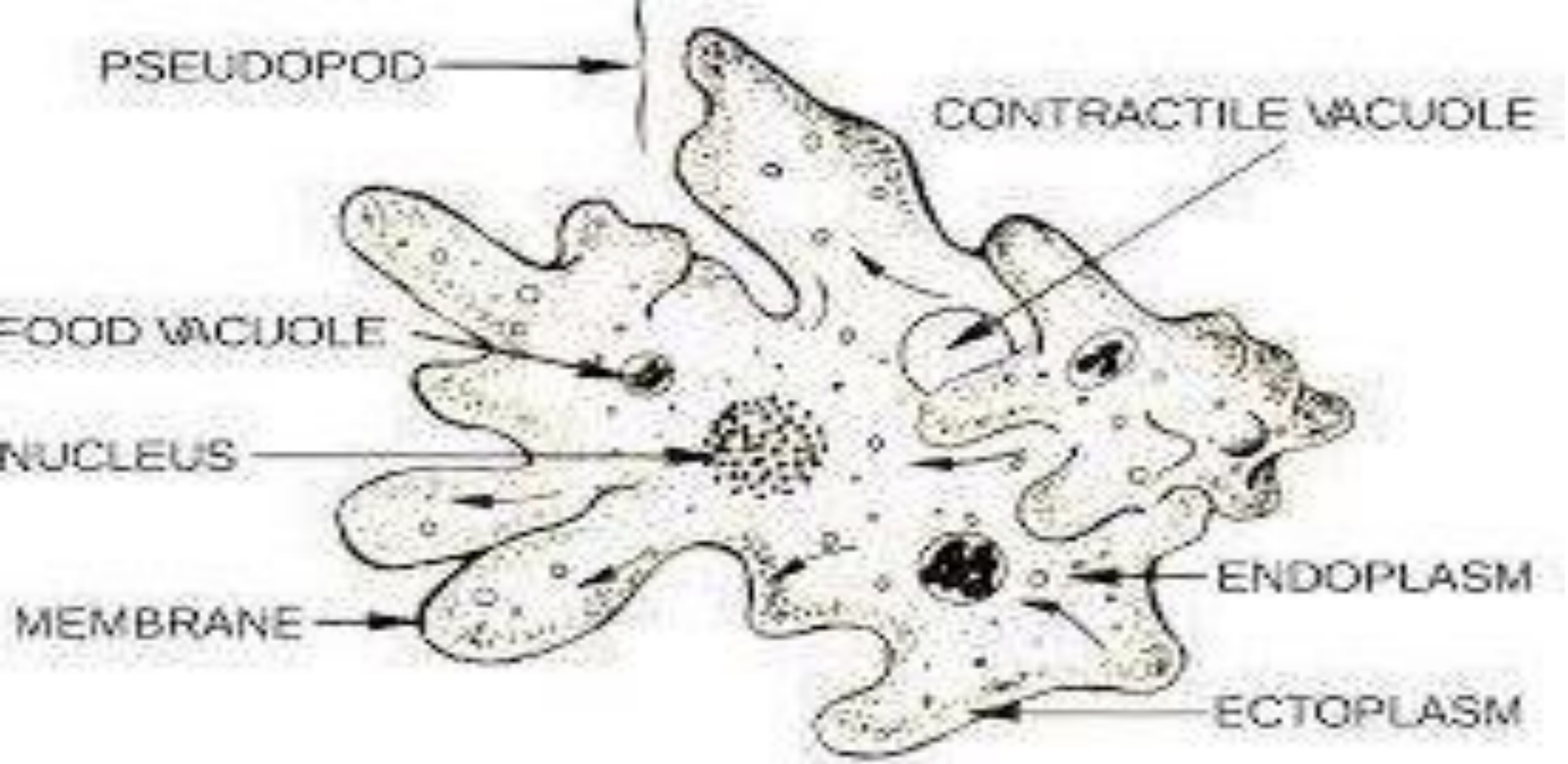
Sub Phylum Sarco-mastigophora Locomotion either by flagella or Pseudopodia

Class Sarcodina Creeping amoeboid forms with lobopodia as locomotory organ

Genus *Amoeba*

Comments:

1. Freshwater Protozoan.
2. It is colorless translucent and irregular in shape.
3. Locomotion is by formation of temporary finger like projections called pseudopodia.
4. Nutrition is Holozoic.
5. Single nucleus and contractile vacuole are present.
6. Reproduction is by asexual method (Binary fission and multiple fission)


PSEUDOPOD
CONTRACTILE VACUOLE
FOOD VACUOLE
NUCLEUS
ENDOPLASM
MEMBRANE
ECTOPLASM

EUGLENA

Systemic -Position

Kingdom -Protista — Unicellular Eukaryotes

Phylum- Protozoa — Unicellular, Primitive animals.

Sub Phylum- Sarco-mastigophora — Locomotion either by flagella or Pseudopodia

Class :- Mastigophora — Plant like flagellates, food is reserved as starch

Genus :- *Euglena*

Comments:

1. Freshwater green flagellate.
2. Body is elongated spindle shaped with whip like single long flagella.
3. It measures 50 -100 micron in length.
4. Flexible and firm shape is attributed to pellicle.
5. It is a chloroplast bearing protozoan.
6. Nutrition is holophytic with starch as a food reservoir.
7. Reproduction is only by longitudinal binary fission.

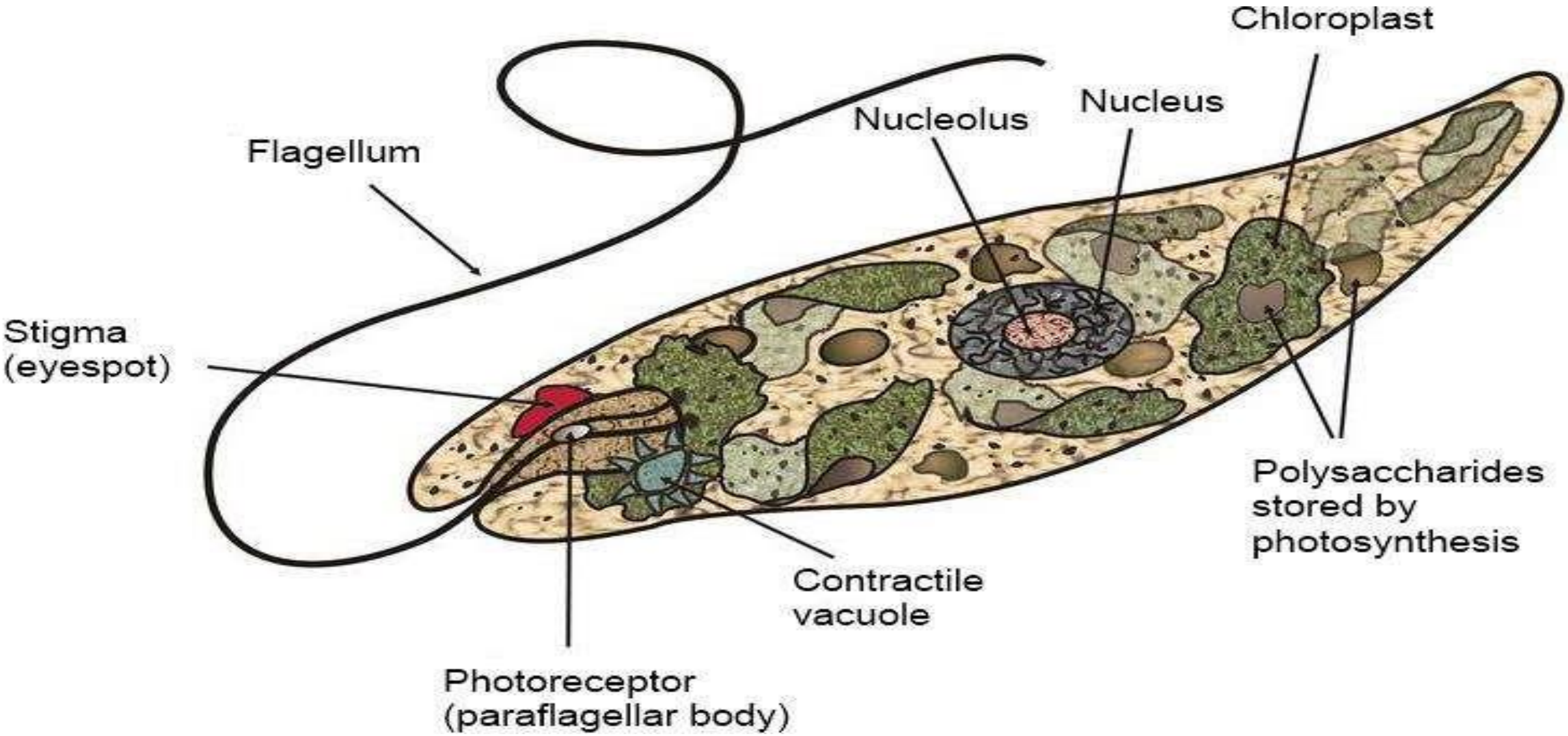


Fig: A diagram of Euglena

PARAMECIUM

Systemic ---Position

Kingdom-- Protista — Unicellular Eukaryotes

Phylum-- Protozoa — Unicellular, Primitive animals.

Class-- Ciliata — Cilia present over body as locomotory

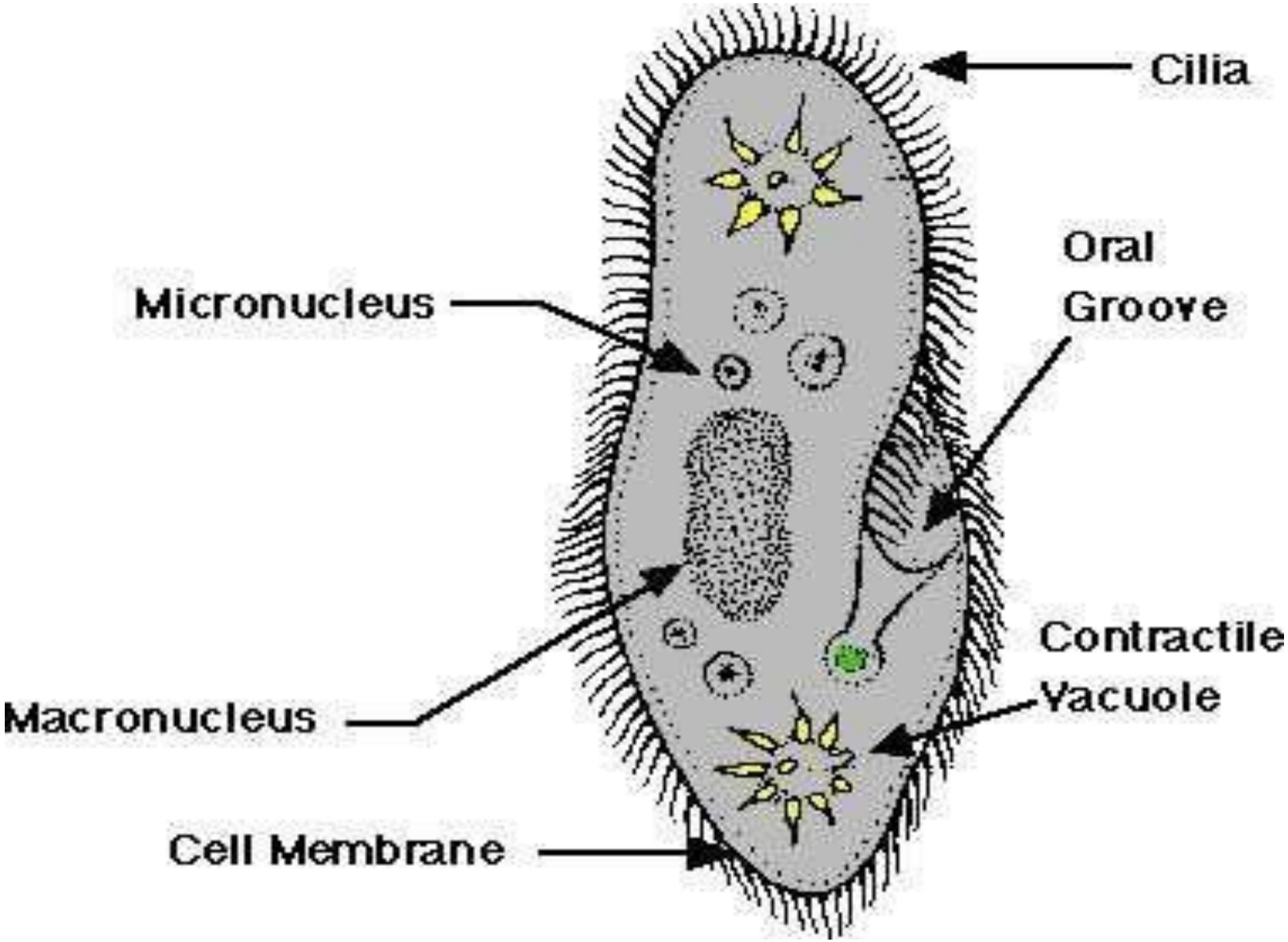
Genus --*Paramecium*

Species - *caudatum*

Comments:

1. It is commonly called as slipper animalcule.
2. Body shape is similar to the sole of a slipper with tapering posterior end and rounded anterior end.
3. Body is entirely covered with cilia and has elongated ciliary tuft at the caudal end.
4. Ventral side has an oral groove.
5. Cytoplasm is divided into ectoplasm and endoplasm.
6. Ectoplasm contains infra ciliary system, basal bodies and trichocyst.

7.Endoplasm contains two nuclei (macro and micro), two contractile vacuoles, food vacuoles and other eukaryotic organelles.
8. Locomotion is done by cilia.
9. Reproduction is either asexual (transverse binary fission) or sexual (conjugation/autogamy


Cilia
Oral
Groove
Micronucleus
Contractile
Vacuole
Macronucleus
Cell Membrane

PLASMODIUM

Systemic- Position

Kingdom -Protista — Unicellular Eukaryotes

Phylum -Protozoa — Unicellular, Primitive animals.

Class -Sporozoa — parasitic form, locomotory organelles absent, spores simple

Genus *Plasmodium*

Comments:

1. Plasmodium is commonly called as malarial parasite.
2. It needs two hosts to complete its life cycle i.e. man and female Anopheles mosquito.
3. Its infective stage to man is named Sporozoite.
4. Crypzoites are formed in liver, out of which some enters into R.B.Cs to undergo multiple fission to form merozoites. These merozoites transforms into male and female gametocytes. From blood they are sucked by female anopheles. Gametocytes in mosquito fuses to form a zygote, which forms sporozoites.

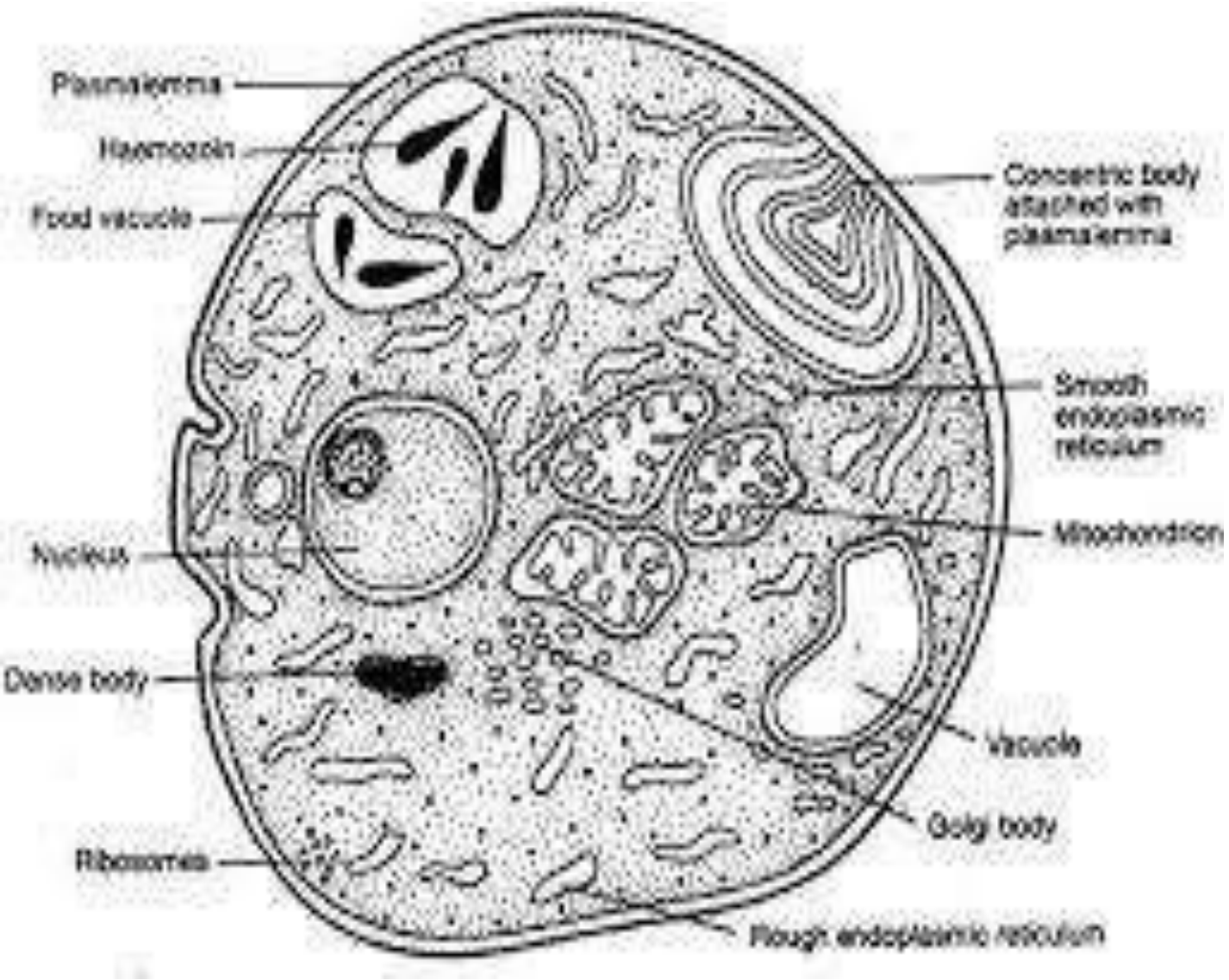


Fig: EM of Trophozoids of Plasmodium in RBC

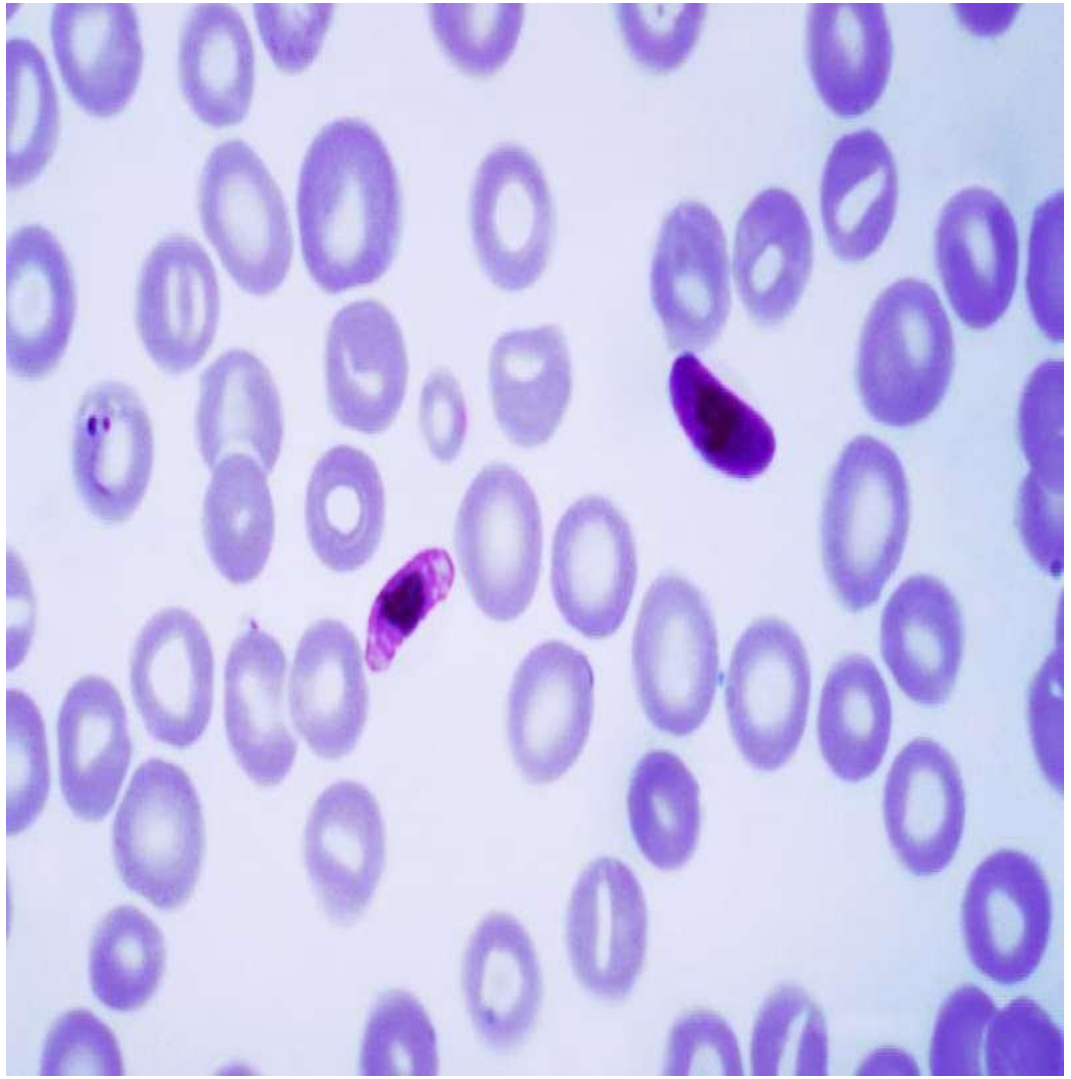


Fig: Plasmodium *falciparum in Human blood smear.*

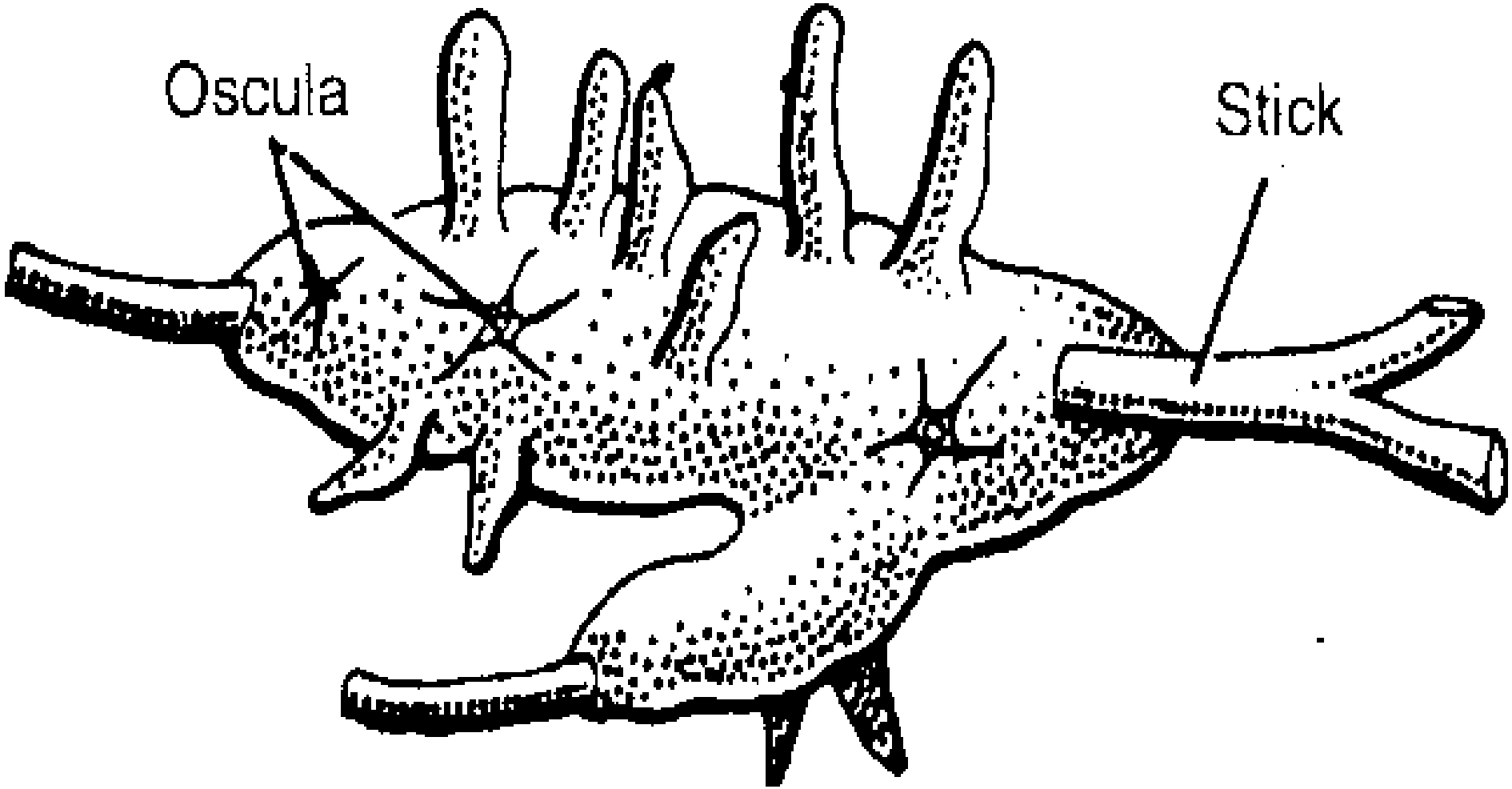
SPONGILLA

Phylum- Porifera — Pore bearing, cellular grade of organization

Class ---Demospongia — Skeleton consist of sponging fibers or siliceous spicules or both.

Comment:

1. It is a fresh water sponge found in lakes, ponds, streams etc.
2. It is green in colour due to the presence of a symbiont *Zoochlorellae* (green algae).
3. Body surface has numerous ostia and several osculate.
4. Endoskeleton is made up of siliceous spicules and spongin fiber.
5. Canal system is rhagon type.
6. Reproduction is by both sexual (gametes) as well as asexual (gemmules) mode.


Oscula
Stick

Practical No. 2: MUSEUM STUDY OF PHYLUM PORIFERA:

SYCON, EUPLECTELLA, CHALINA,SPONGILLA

SYCON

Phylum ---Porifera — Pore bearing, cellular grade of organization
Class--- Calcarea — endoskeleton of calcareous spicules
Genus ----Sycon

Comment:

1. It is a Marine sponge.
2. Body is slender vase shaped measuring around 2-3 cms.
3.Body surface is perforated by numerous ostia and a large osculum at the free end.
4. Canal system is syconoid.
5. Reproduction is by asexual and sexual methods.

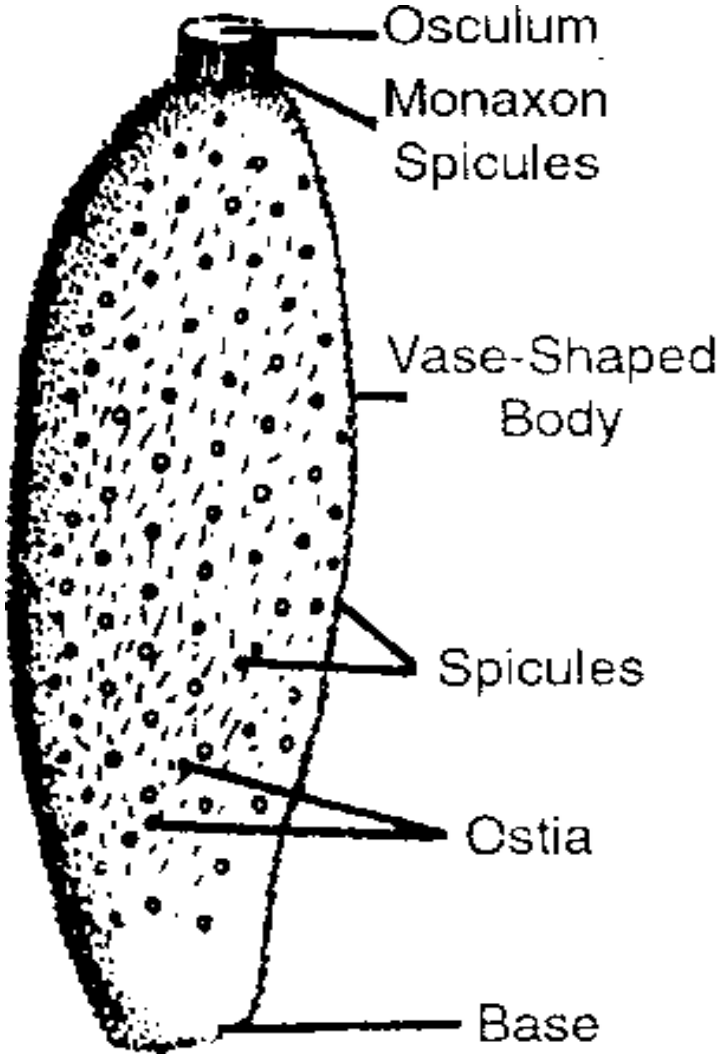


Figure : *Sycon*

EUPLECTELLA

Phylum--- Porifera Pore bearing, cellular grade of organization

Class ---Hexactinelida Skeleton consist of siliceous spicules

Genus--- ***Euplectella***

Comment:

1. *Euplectella* is commonly called as venus flower basket

2. Numerous ostia are present on the long,curved, cylindrical body.

3. It is attached to the surface of mud and measures 15-30 cm in length.

4. A beautiful 3D interlaced network of 6 rayed spicules is present.

5. Osculum is closed with a sieve plate.

6.It displays an interesting commensal relation with shrimps. The young shrimp enters in the sponge to feed. It grows their and then trapped as the increased size of shrimp now doesn't allow it leave the spongocoel of *Euplectella*. This lifelong bonding has made it a popular wedding gift in Japan.

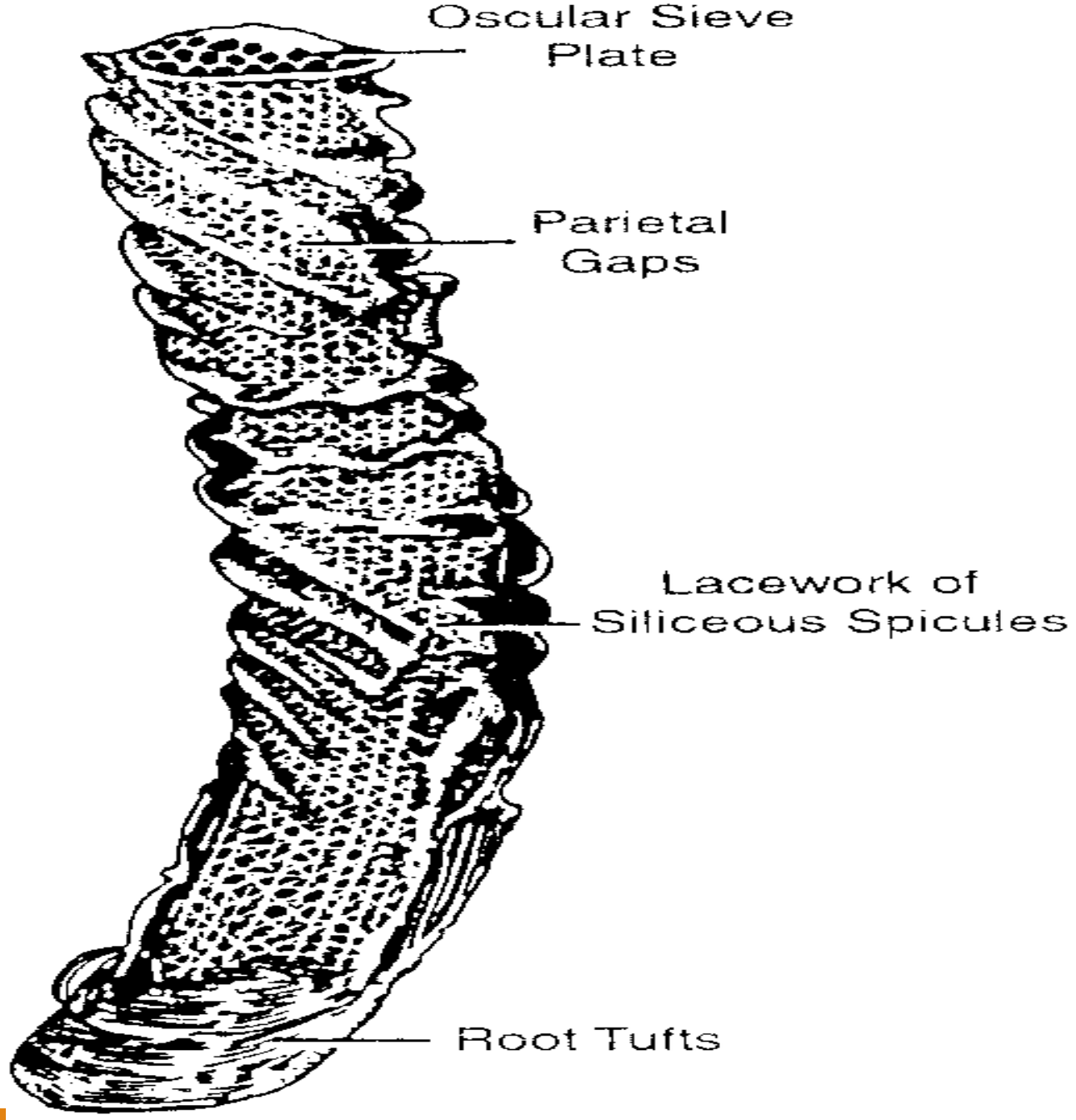


Fig. Euplectella

CHALINA

Phylum ---Porifera Pore bearing, cellular grade of organization

Class ---Demospongia Skeleton consist of sponging fibers or siliceous spicules or both.

Genus ---*Chalina*

Comment:

1. It is commonly called as dead man's finger/mermaid's gloves.
2. It is yellow to red in colour.
3. Body surface is flat with finger like branches protruding.
4. Body surface has numerous ostia and several oscula.
5. Canal system is leucon type.
6. Reproduction is by both sexual (gametes) as well as asexual (budding/regeneration) mode

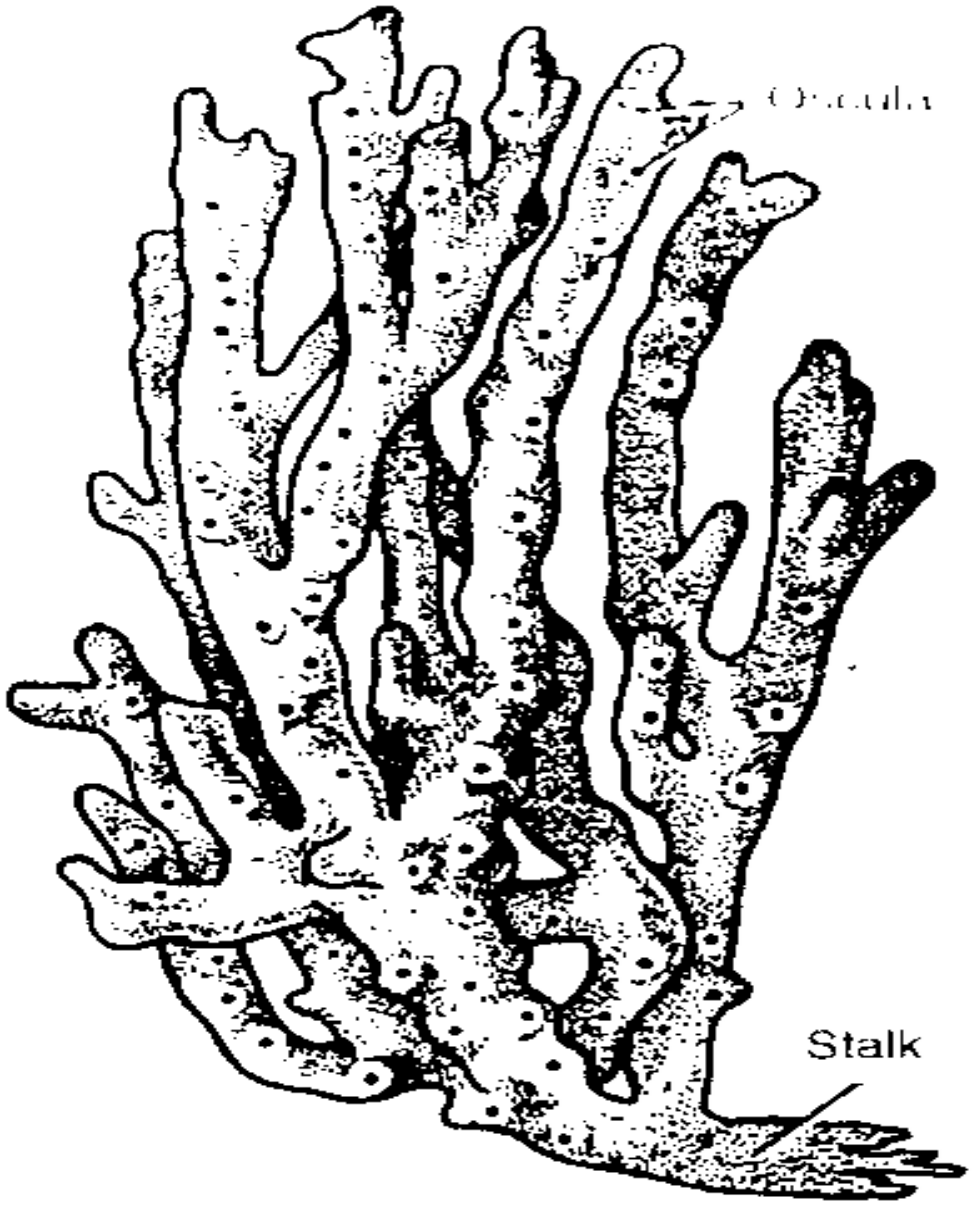


Fig: Chalina

PHYLUM CNIDARIA:-

General Characteristics of Cnidaria:-

Cnidaria includes coral animals, true jellies, sea anemones, sea pens, and their allies.

These were earlier called Coelenterates which is no longer recognized as scientifically valid.

Phylum cnidaria contains over 10,000 species of animals. These are exclusively aquatic and mostly inhabit marine environments.

The name Cnidaria comes from the Greek word "cnidos," which means stinging nettle. Cnidarians got this name because their nematocysts eject barbed threads tipped with poison.

Cnidarians are multicellular animals.

They contain hollow body cavity known as **Gastrovascular cavity** which is not a true coelom.

They may be sedentary or free swimming forms.

Body wall consists of 2 layers of cells - **Ectoderm/epidermis** and **Endoderm/gastrodermis** there is a jelly like layer called, **Mesoglea** is present in between two layer.

They show the phenomena of **polymorphism** and exist in two basic forms- **Polyp** and **Medusa**

2) **Polyp**

a) It is ssesile and asexual zooid.

b) They are approximately cylindrical in shape and elongated at the axis of the body.

c) In solitary polyps, the aboral end is attached to the substrate by means of a disc-like holdfast called the **pedal disc**, while in colonies of polyps it is connected to other polyps, either directly or indirectly.

d) The oral end contains the mouth and is surrounded by a circlet of tentacles.

(ii) **Medusa**

a) It is free swimming and sexual zooid.

b) Medusae vary from bell-shaped to the shape of a thin disc, scarcely convex above and only slightly concave below.

c) The upper or aboral surface is called the **ex-umbrellar surface** and the lower surface is called the **sub-umbrellar surface**.

d) The mouth is located on the lower surface, which may be partially closed by a membrane extending inward from the margin, called the **velum**.

•Cnidarians possess **nematocysts** which serves the function of paralysing the prey by injecting prey .

•Reproduction is both asexual and sexual. The eggs develops into a cilliated larva known as **planula**

HYDRA :-

Classification

Phylum - Cnidaria
Class - Hydrozoa
Order - Hydroida
Genus - *Hydra*

Geographical Distribution

Cosmopolitan, but most common in India, Canada and U.S.A.

Habitat

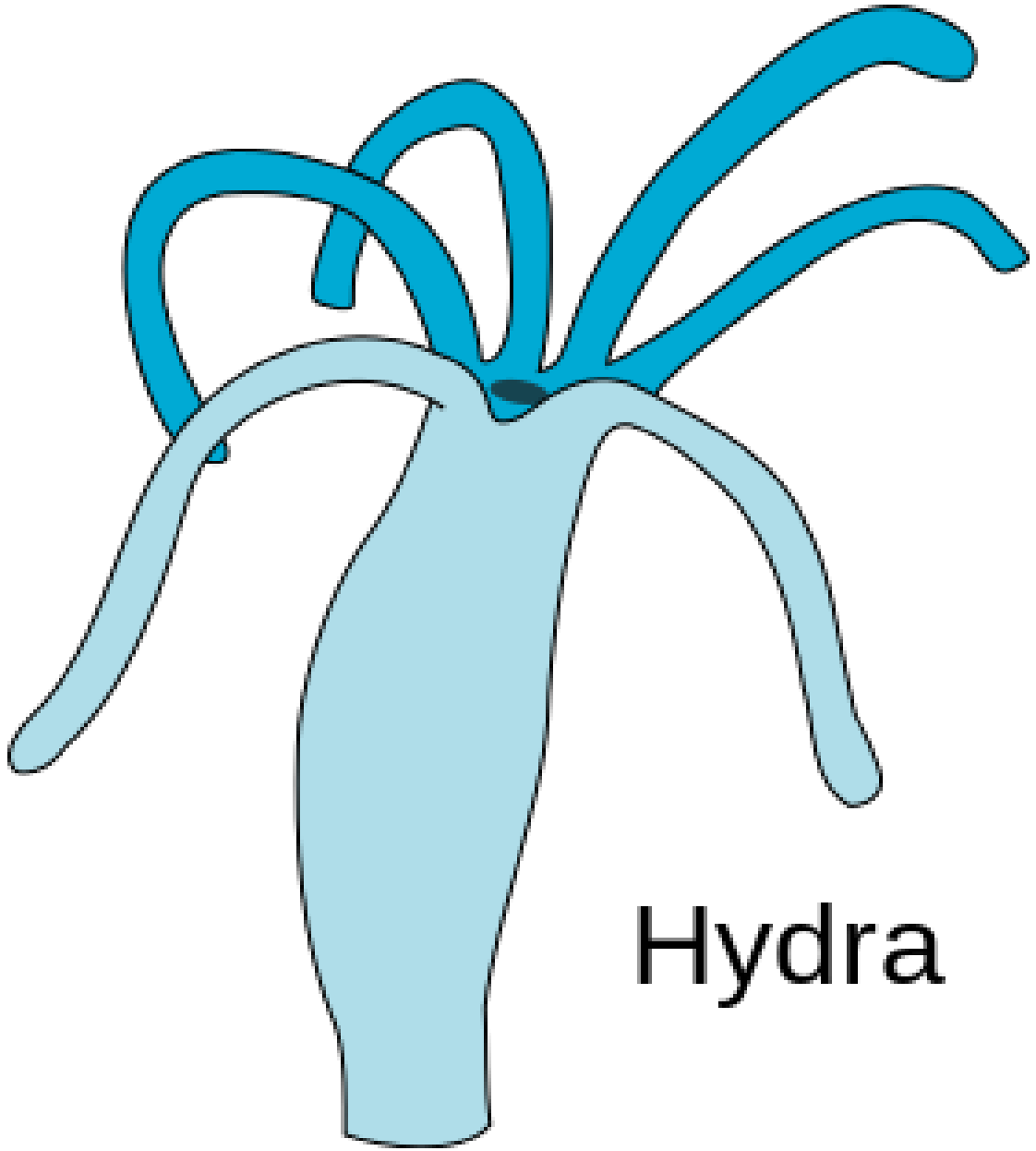
It is freshwater solitary animal found attached to some objects in ponds, lakes and streams.

Identifying Features

Hydra is elongated, cylindrical and measures 1-3cm in length.
Proximal end of body is known as **Basal disc** or foot, and is used for locomotion.
The free distal end bears mouth situated on a conical elevation called the **Hypostome**.
Hypostome is encircled by 6-10 tentacles which are finger-like, hollow projection provided with nematocytes.
Body wall is Diploblastic.

Common Characters

Digestive cavity or GASTROVASCULAR CAVITY is enclosed by body wall.
Reproduction by both sexual and asexual means.
Gonads appear as buds on the sides of body.
Testes lie near the oral end and ovaries near the base.


Hydra

AURELIA:-

Classification

Phylum - Cnidaria

Class - Scyphozoa

Order - Semaestomae

Genus - *Aurelia*

Common name

Jelly fish

Habit and Habitat

It is a medusoid Jelly fish which is solitary and marine in habit. It mostly lives in warm and temperate latitudes. It feeds on diatoms, protozoans, molluscs, crustaceans and copepodes.

Distribution

It is found along the entire Atlantic coast and Pacific coast.

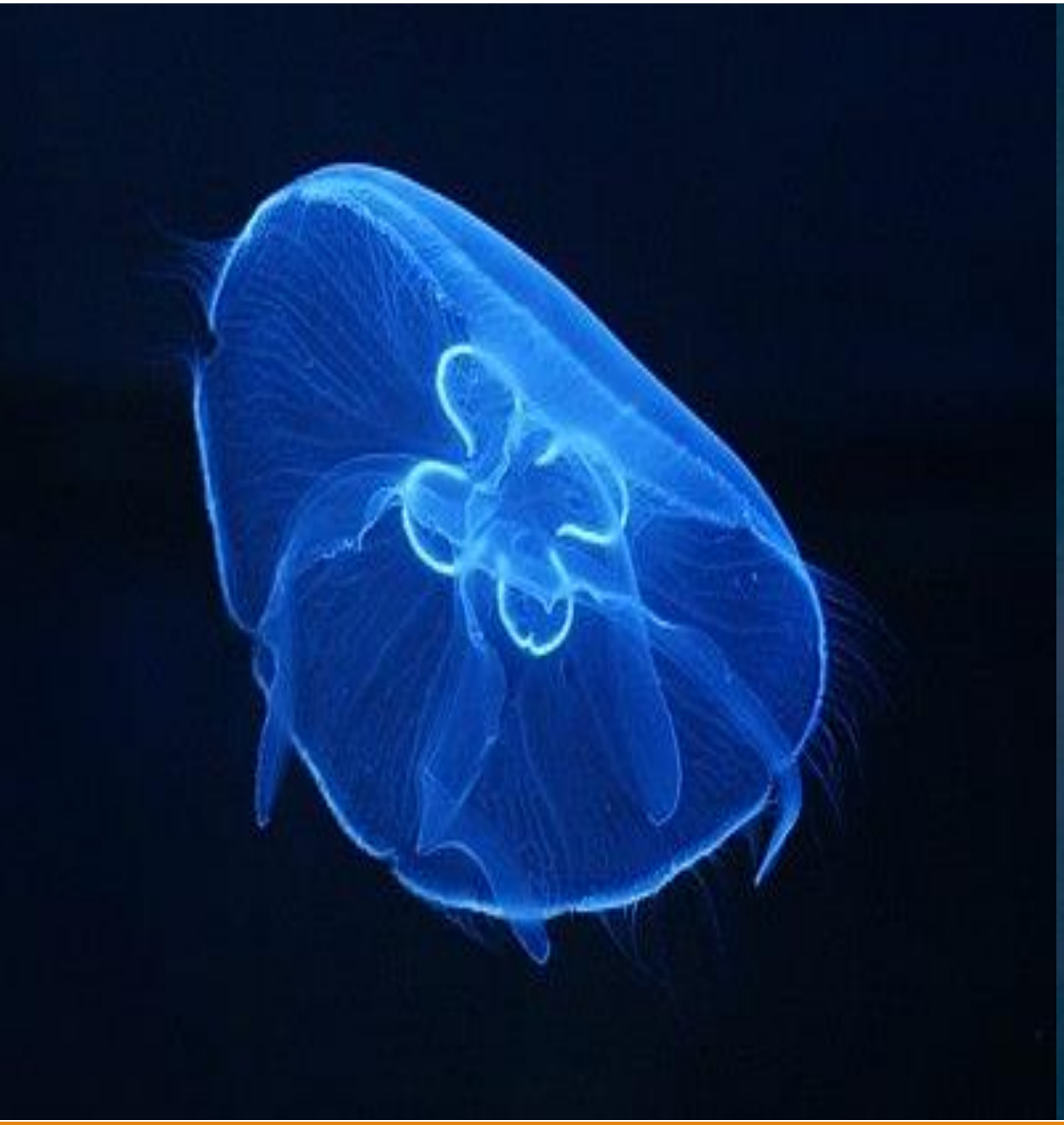
Identifying Characters:-Body is totally transparent and gelatinous. **Mesoglea** reflects lightrays with crystal-like clearness.

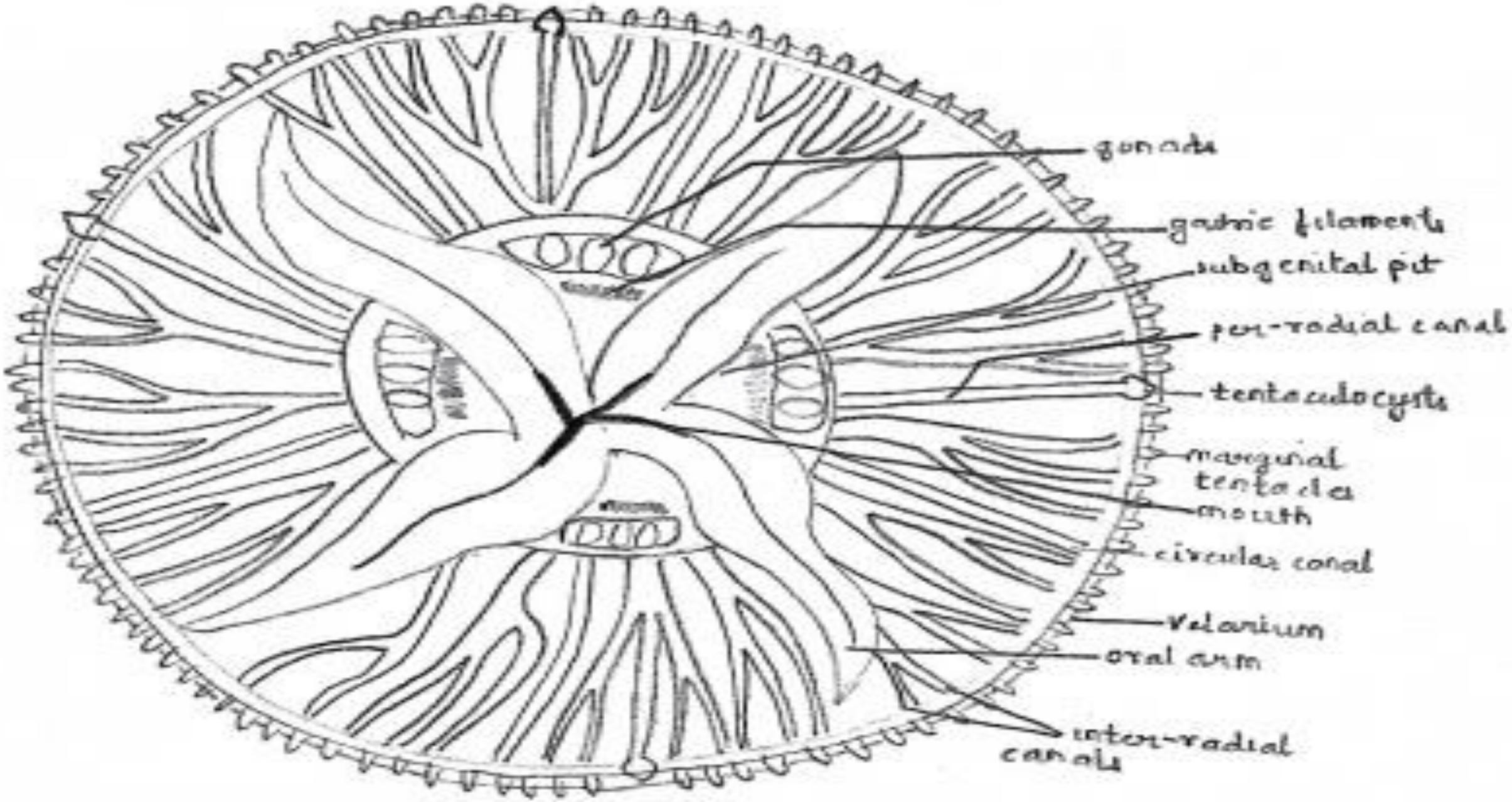
Body is made up of about 98% water.

Body colour is bluish-white or pinkish.

It is about 30 cm in diameter.

Body is composed of **saucer-shaped umbrella** which can be divided into **ex-umbrellar** and **sub-umbrellar** surfaces.
Subumbrellar surfac consists of marginal tentacles, marginal lappet and manubrium.
Marginal tentacles contain stinging cells.
Marginal lappets are eight in number and contain sense organs namely **tentaculocysts** in eight lobes.
Manubrium hangs down from the centre of subumbrellar surface.
It is surrounded by four, frilled and long **oral arms** disposed along four perradii.
There are four rounded apertures called **subgenital pits** found in between oral arms.
Mouth leads to a short gullet which directly opens into the stomach.
Stomach consists of four interradial gastric pouches. Each gastric pouch gives rise to branched radial canals communicating with circular canal.
There are three kinds of radial canals: Interradial, Adradial and Perradial
Locomotion occurs with the help of rhythmic contractions of umbrellar surfaces.
Aurelia is dimorphic having male and female sexes separately.
Development is indirect and include **planula**, **scyphistoma** and **ephyra larva**.
Life cycle exhibits schyphistoma larva as the only polypoid stage. Rest all stages are medusoid.




gonads
gastric filaments
subgenital pit
peri-radial canal
tentaculocysts
marginal tentacles
mouth
circular canal
Velarium
oral arm
inter-radial canals

Metridium

. **Common Name**

Sea anemone or Plumose anemone

Distribution:- Found on the Atlantic Coast, Northen Pacific coast and Europe.

Habitat:-It is marine and sessile form, found attached to the rocks and solid objects; from tide pools to a depth of 90 fathoms.

Identifying Features

Body is cylindrical and divisible into 3 distinct reagions; pedal disc, column and oral disc.

Body size may vary from few centimeters to 1 meter.

Pedal disc (foot) helps in attachment with substratum.

Column is differentiated into two parts: Capitulum(thin-walled) and Scapus(thick-walled.

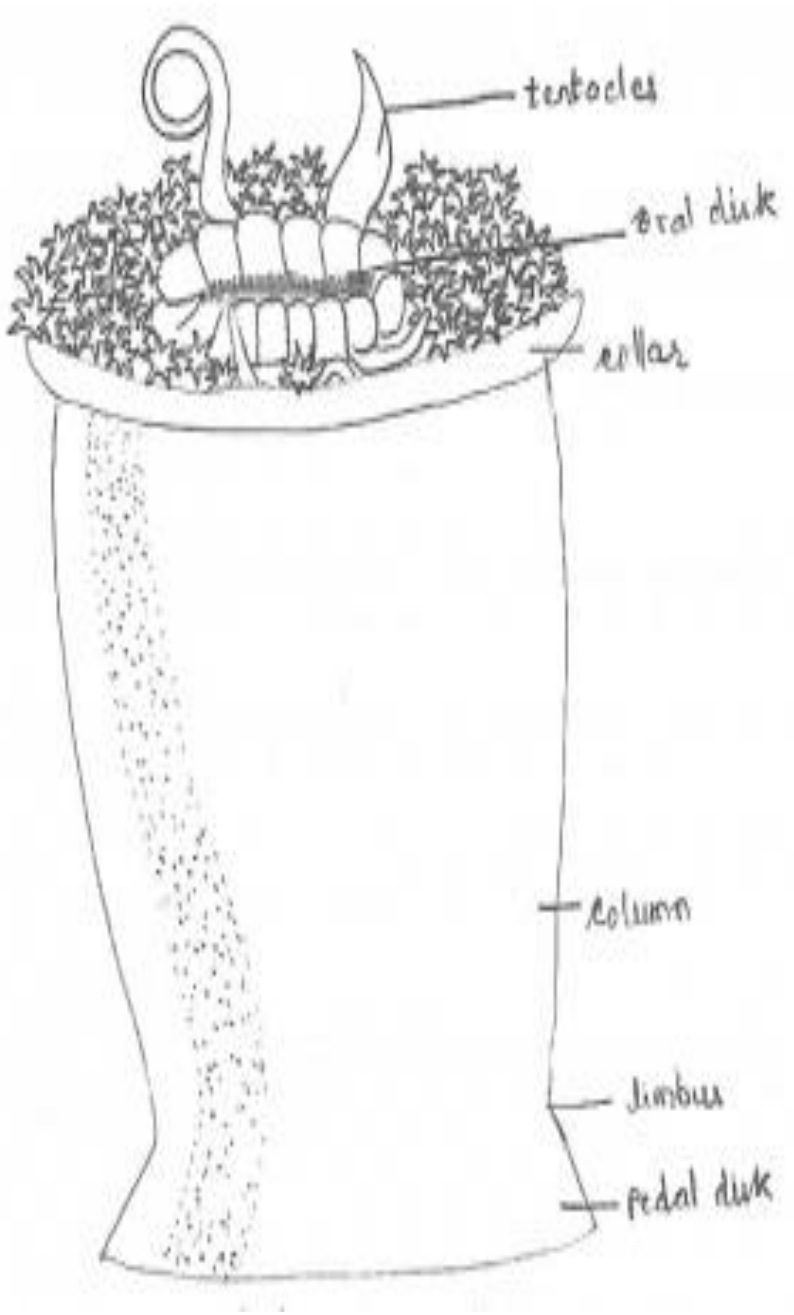
The wall of scapus is perforated by small openings called cinclides.

Oral disc has a mouth in the centre which is surrounded by numerous tentacles.

General Characters :-Mouth opens into gastro vascular cavity via a short gullet.

Sea anemones are predaceous, immobilizing their prey with the aid of specialized stinging cells called nematocysts.They feed on small planktons

Sexes are separate. Gonads are present on mesentries.


tentacles
oral disk
collar
column
limbus
pedal disk

PHYLUM PLATYHELMINTHES - *PLANARIA* :-

Common name- Dugesia

Habitat- freshwater species, found in ponds, lakes and springs.

Distribution- Cosmopolitan in distribution, found in India, Myanmar, U.K., U.S.A., and USSR.

IDENTIFYING CHARACTERS:--

Body- Body is elongated, cylindrical and dorsoflattened.

Body length- 2-15 mm.

Body colour- brown to black.

Body division- It is divided into anterior head and posterior body.

Head- It is triangular containing **auricles** (ear like) and **eyes or ocelli** (semicircular, one pair). Auricles and eyes both are sensory structures.

Posterior body- it contains highly pointed end.

Digestive system- complete, consisting of mouth, pharynx, proboscis and intestine (branched).

Mouth-The mouth is situated in middle of the ventral surface and is surrounded by **proboscis pore**.

Intestine- It has three branches in which one is extending upwards and other two are extending backwards. **Genital pore-** It is located posterior to the mouth.

Reproduction- It reproduces sexually or asexually. **Regeneration** also occurs

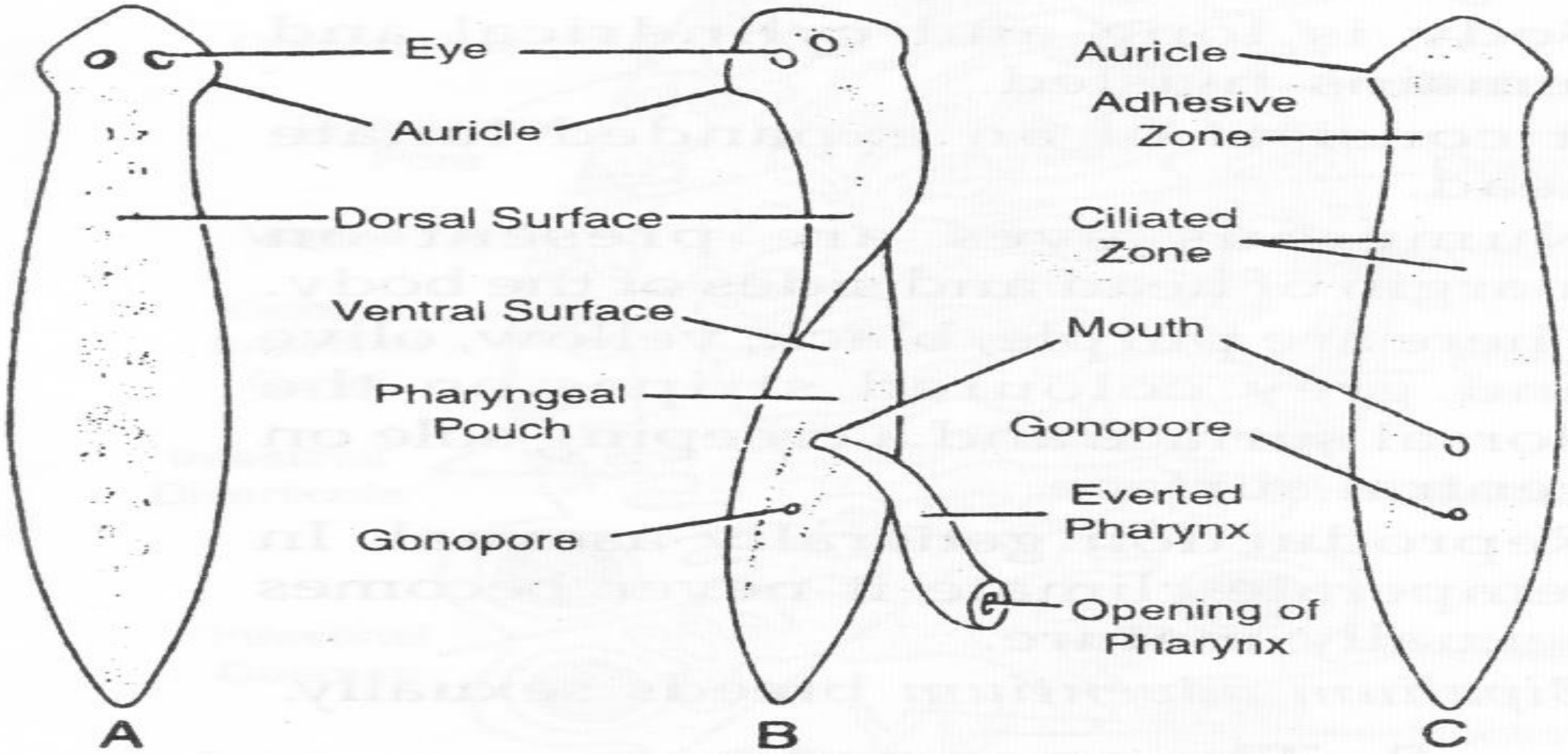


Fig. 6. *Planaria (Dugesia)*

TAENIA SOLIUM :-:

Common Name- Pork tapeworm.

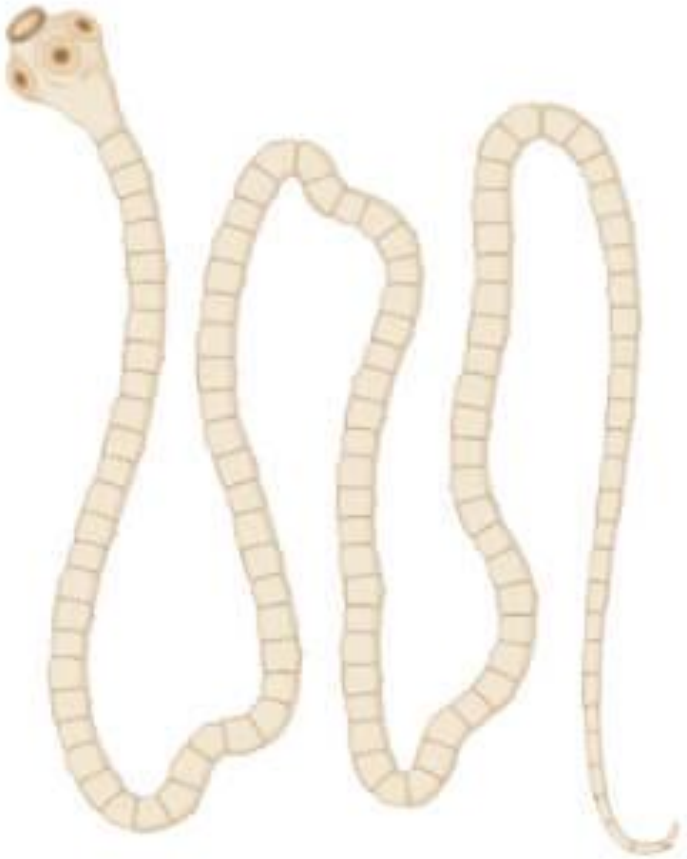
Habit and habitat- It is the parasite in the intestine of man.

Distribution- it is found in India, China, Yogoslavia, and Germany.

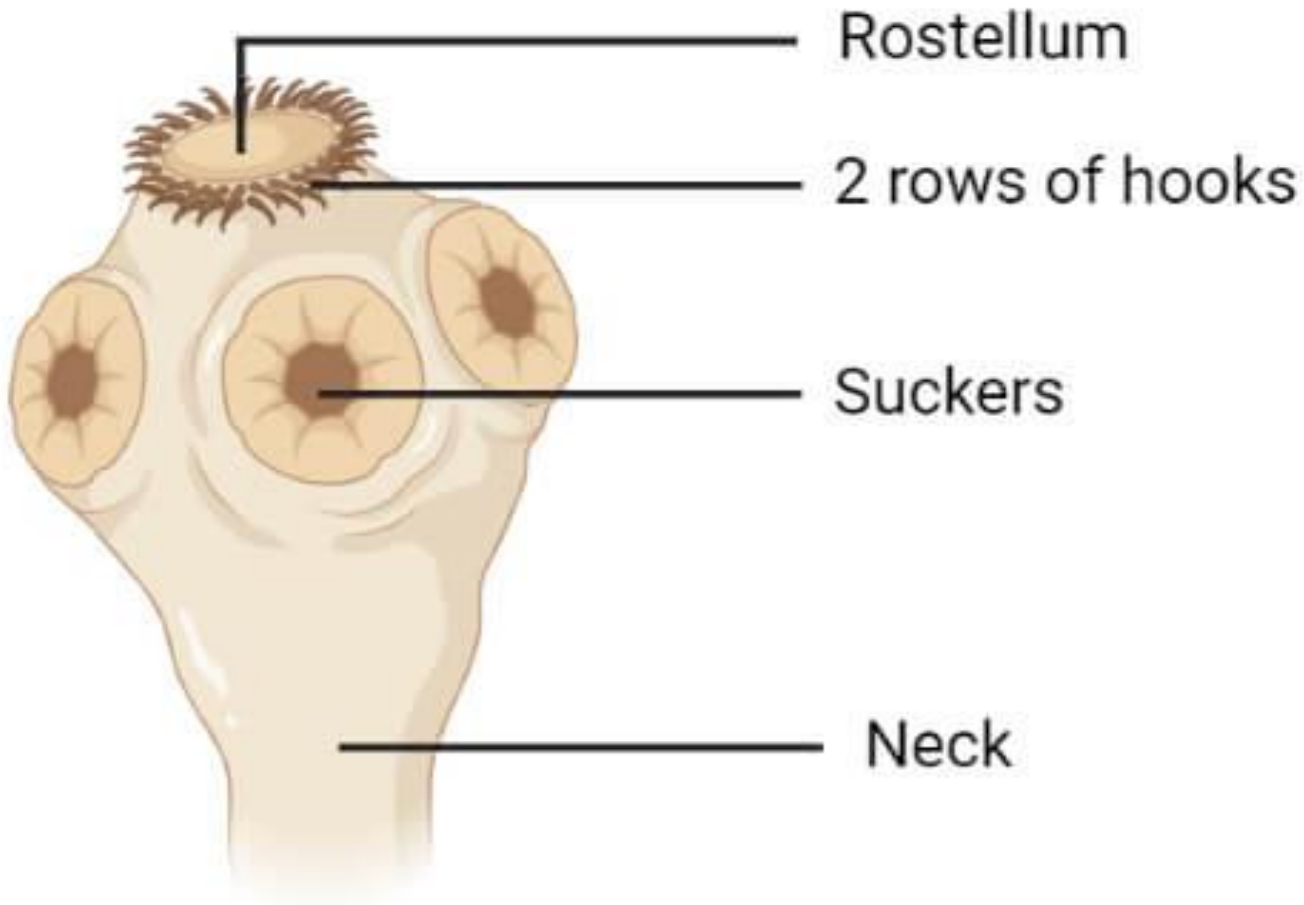
IDENTIFYING CHARACTERS:-

- **Body-** Body is about 4-5 meters in length.
- **Segmentation-** it consists of about 700-900 segments.
- **Body division-** It is differentiated into **scolex**, **neck** and then immature, **mature**, **gravid** and **malformed** segments.
- **Mature segments-** They contain fully developed **hermaphrodite genital organs**.
- **Scolex-** It is adhesive in nature, consisting of **four suckers** and a rounded **rostellum**(surrounded by a double row of 28-32 hooks).
- **Life cycle-** Life cycle of *T. solium* is indirect. It requires an intermediate host **pig** for development.
- **Diseases-** It causes diseases like anaemia, secondary anaemia, eosinophilia, diarrhea, haemorrhage, abdominal pain and nausea etc.

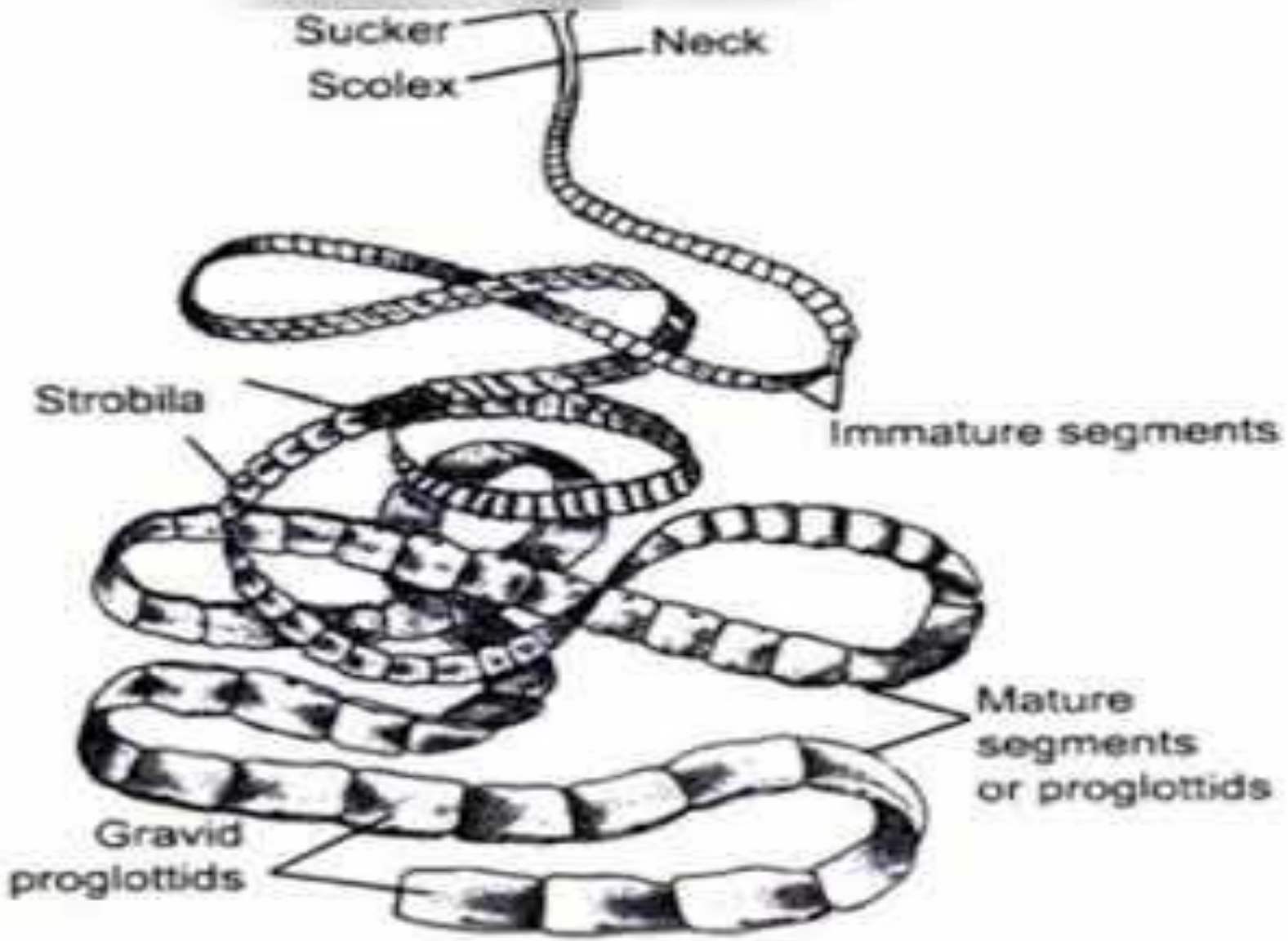
Taenia solium- Classification, Habitat, Structures, Body wall



Adult *Taenia solium*



Scolex


Sucker
Scolex
Neck
Strobila
Immature segments
Mature
segments
or proglottids
Gravid
proglottids

FASCIOLA HEPATICA :-:

Common name- *Sheep liver fluke.*

Habit and habitat- It is a pathogenic parasite in the liver and bilary passage.

Distribution- Cosmopolitan distribution. It found in sheep raising areas like India, U.S.A., Cuba and Syria etc.

IDENTIFYING CHARACTERS:-

- **Body-** It has beef like and dorso-ventrally flattened body.
- **Body length-** 18-50 mm in length.
- **Mouth-** Mouth is small and ventrally situated at anterior extremity.
- **Suckers-** There are two types of suckers naming **oral** and **ventral sucker.**
- **Oral sucker-** It surrounds the mouth and located at the anterior extremity.
- **Ventral sucker-** It is also called **acetabulum** (adhesive in nature) and is located a little behind to the mouth.
- **Pores-** gonopore and excretory pore.
  - (1)**Gonopore** is located between oral and ventral suckers
  - (2)**Excretory pore** is located at posterior extremity
- **Cephalic cone-** Anterior end consists of a **conical projection**. This is called cephalic cone.
- **Hermaphrodite.**
- **Digestive system-** It consists of mouth, oral sucker, pharynx, oesophagus and bifid intestine.
- **Life cycle- Indirect** and is completed in two hosts **sheep** and **snail.**

Fasciola hepatica w.m.

Study of Paramecium: Culture, External morphology, Conjugation and Binary fission.

Habit, Habitat and Culture of Paramecium Caudatum:

Paramecium caudatum (Gr., paramekes = oblong; L., caudata = tail) is commonly found in freshwater ponds, pools, ditches, streams, lakes, reservoirs and rivers. It is specially found in abundance in stagnant ponds rich in decaying matter, in organic infusions, and in the sewage water. Paramecium caudatum is a free-living organism and this species is worldwide in distribution.

Culture of Paramecium:

Take submerged weeds from a pond and place in a jar of distilled water, cover the jar and leave it to rot; swarms of Paramecia will appear in a few days. Now boil hay in water, decant the infusion and add a few grains of wheat, and let it stand till turbid with bacteria.

Transfer Paramecia from the first jar into this liquid where they will multiply rapidly. Hay infusions alone will produce Paramecia showing presence of cysts, and cyst resembling sand grains have been reported, but there is no proof of Paramecia forming cysts, since they have never been confirmed.

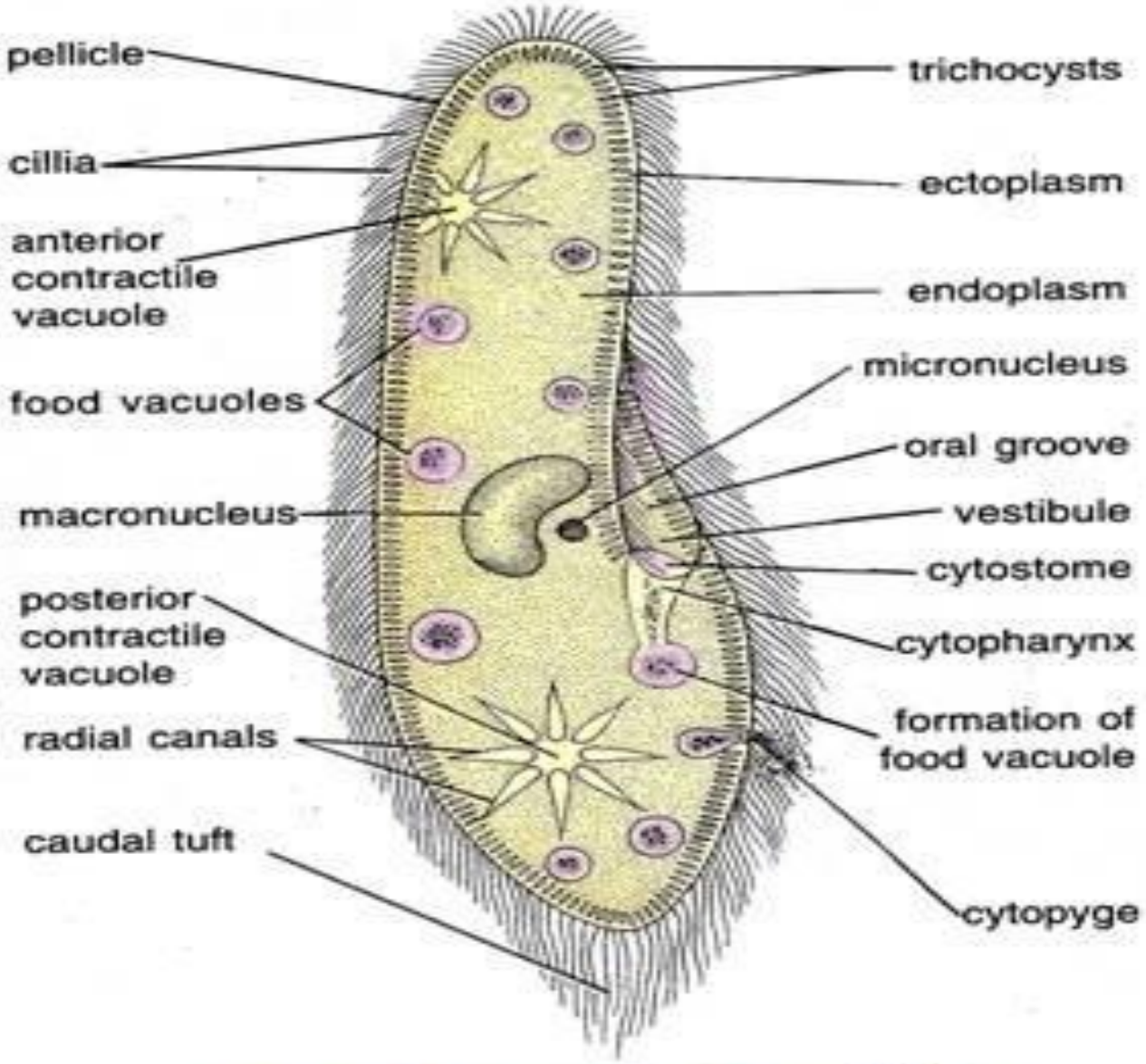


Fig. 20.1. *Paramecium caudatum.*

Conjugation (sexual reproduction)

- Frequently referred to as sexual reproduction.
- It is simply the temporary union of 2 individuals who mutually exchanging part of their micronuclear materials.
- It is a unique process in which 2 individuals separates soon after the exchange of their nuclear materials.
- This process in paramecium occurs frequently between binary fission and is necessary for the continued vitality of the species.

Process of conjugation

It differs slightly in different species of paramecium. The following is related to *P. caudatum*.

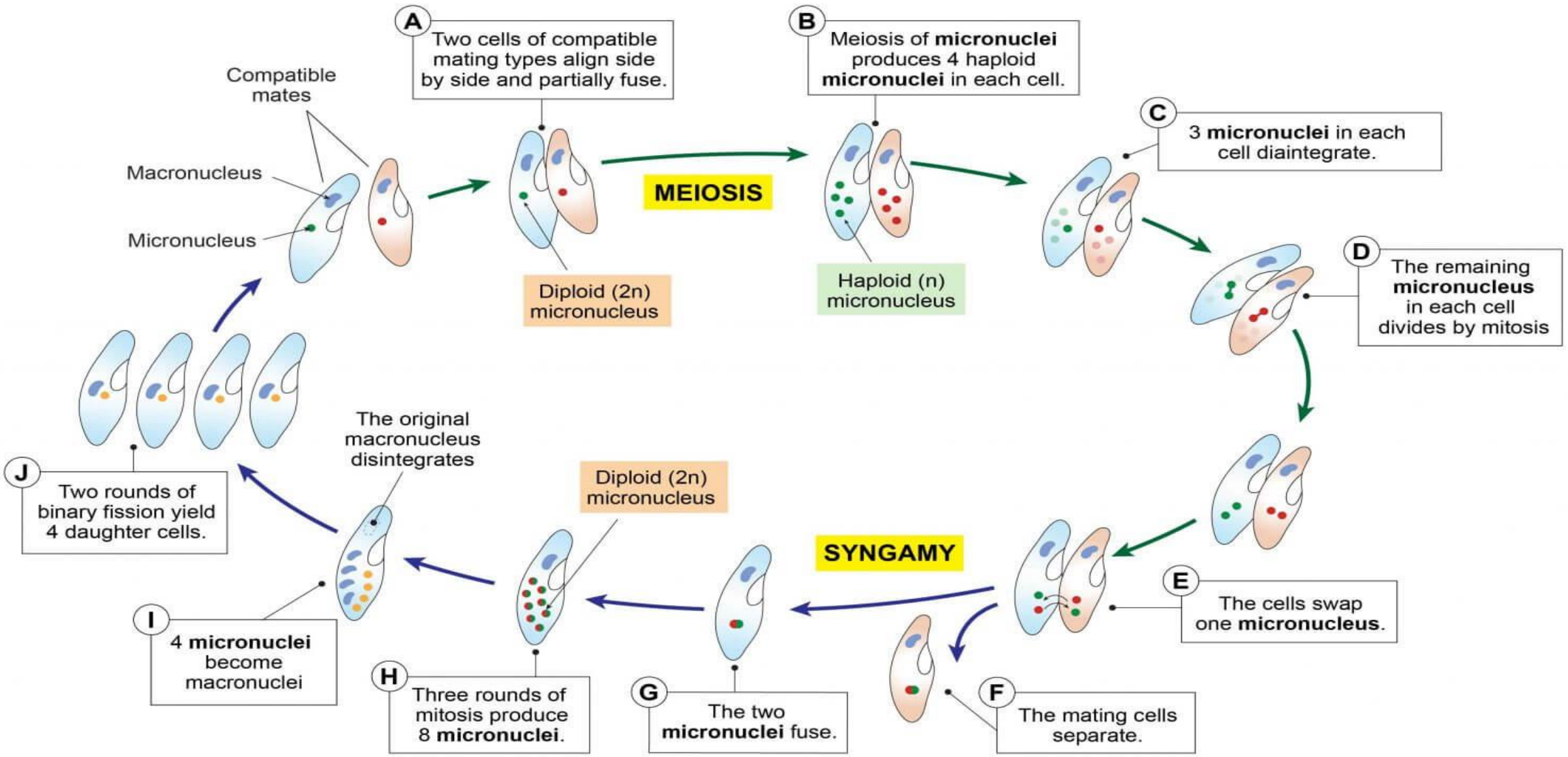
In conjugation (sexual reproduction) the two paramaecia or **preconjugates** from 2 different mating types of the same variety come in contact ventrally and unite through the edges of their oral groove.

Their cilia produce a substance on the surface of the body which causes the adhesion of 2 conjugating paramecia.

They then stop feeding and their buccal structure disappears.

The pellicle and ectoplasm, all along with the union of two forms, are disintegrated and a **protoplasmic bridge** is formed between 2 individuals.

Conjugation of Paramecium



Transverse binary fission (Asexual reproduction)

This is the commonest type of Asexual reproduction in *Paramecium*.

It occurs during the favourable condition when food is available in large quantities and the temperature is favourable.

It is a unique asexual process in which one fully grown specimen divides into 2 daughter individuals without leaving the parental corpse.

The division is at the right angle to the longitudinal axis of the body.

The division of the whole-cell body as a whole is always preceded by the division of nuclei; indeed, it appears that reproduction is initiated by nuclear activity and division.

In this process, the **micronucleus** starts dividing by the complicated process of **mitosis** into 2 daughter micronuclei which move in opposite ends of the cell.

Simultaneously, the **macronucleus** divides transversely **amitotically** by simply becoming elongated and constricted in the middle.

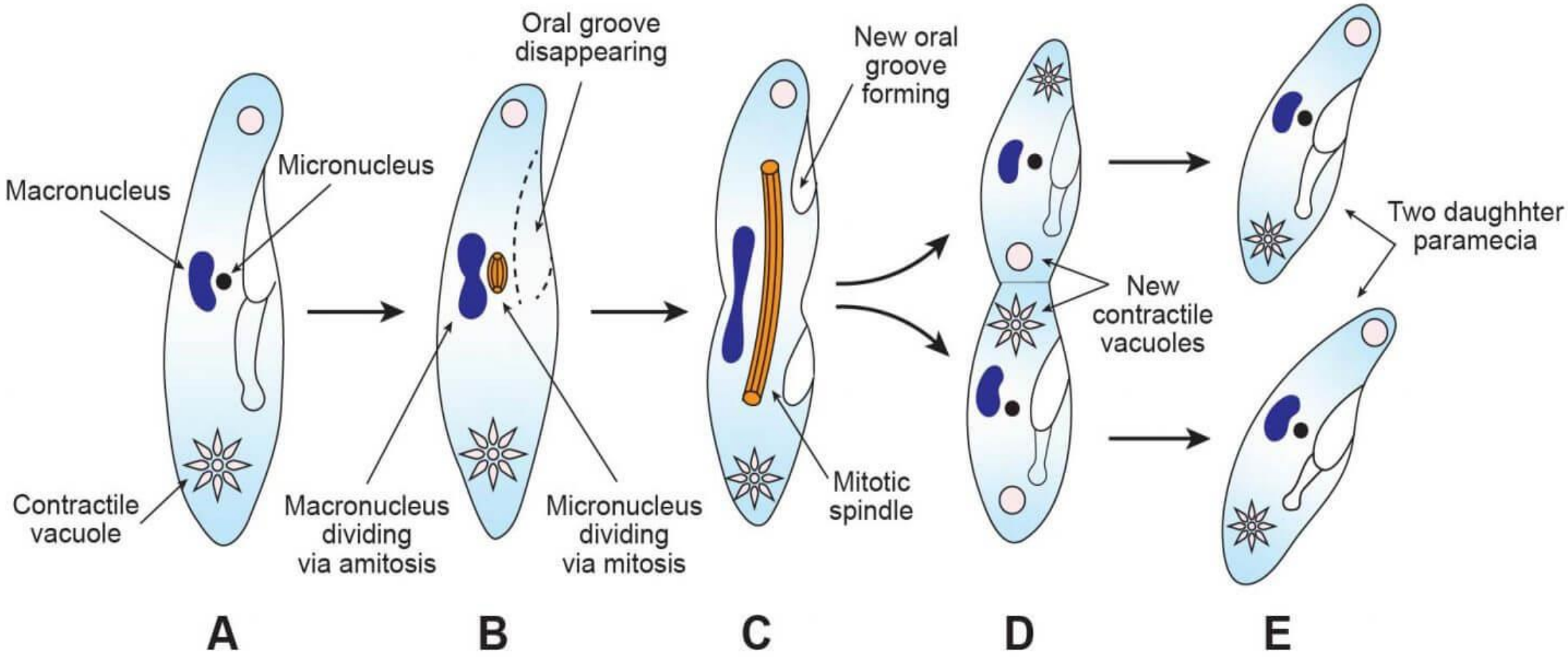
2 oral grooves now begin to form, one in the anterior half and the other in the posterior half.

2 original contractile vacuoles remain one in each half of dividing parental individuals.

2 new contractile vacuoles are later formed and also 2 new buccal structures appear.

In meantime, constriction furrows appear near the middle of the body.

Binary fission of Paramecium



Study of permanent slides: Spicules and Gemmules in Sponges, T.S. of *Sycon*, T.S. of Hydra, Taeniasolium: Scolex, Gravid proglottid

Spicules of Sponge:

1. The spicules are structures which form the supporting skeleton in sponges.
2. They may be either calcareous or silicious in nature
3. They may be either monaxon (having one ray) triaxon (having 3 rays) or tetraxon (having 4 rays).
4. Some times they form specialised amphidiscs.
5. They are secreted by special scleroblast cells.
6. Each of them has a central organic axis around which minerals are deposited.

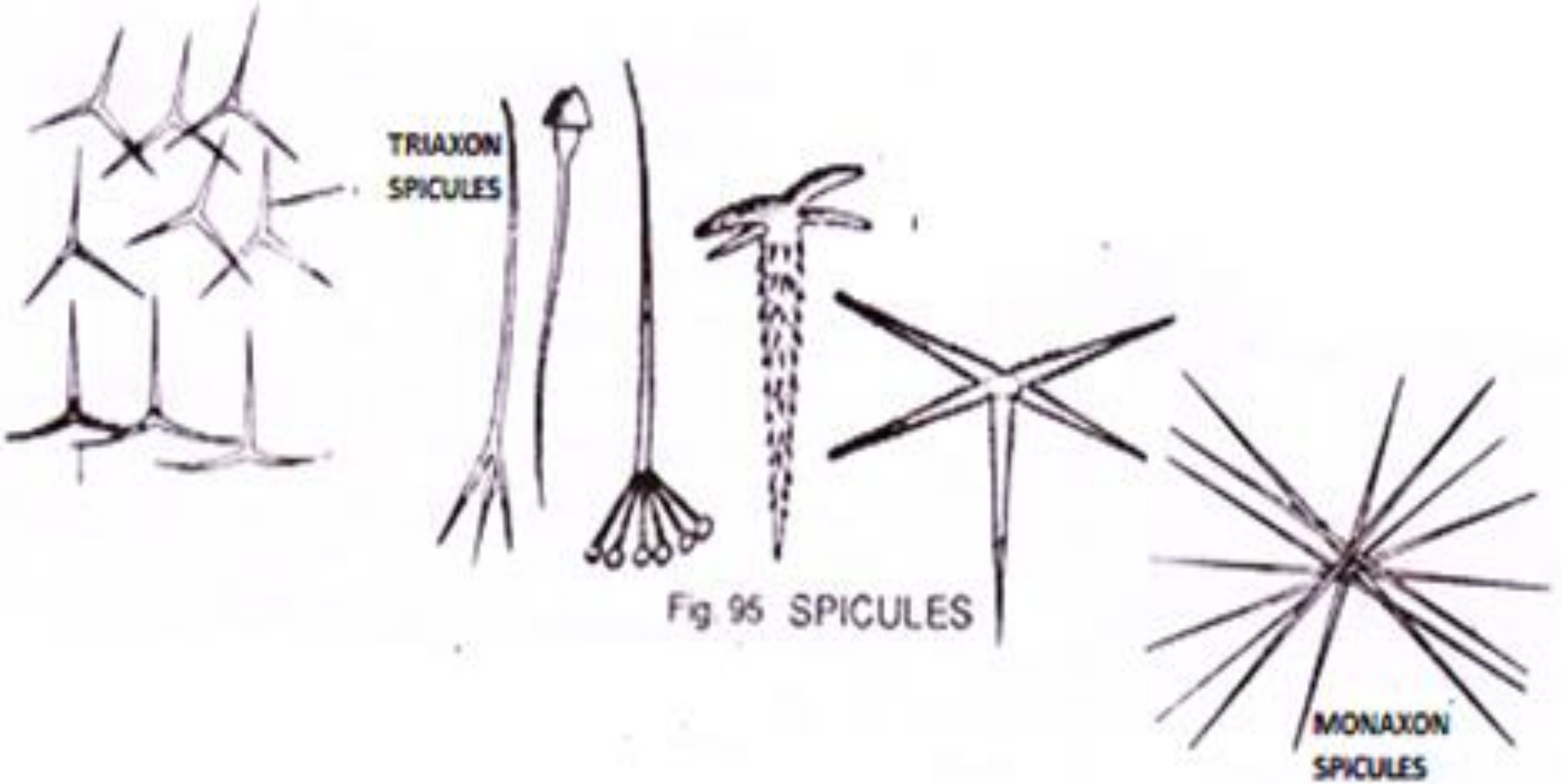
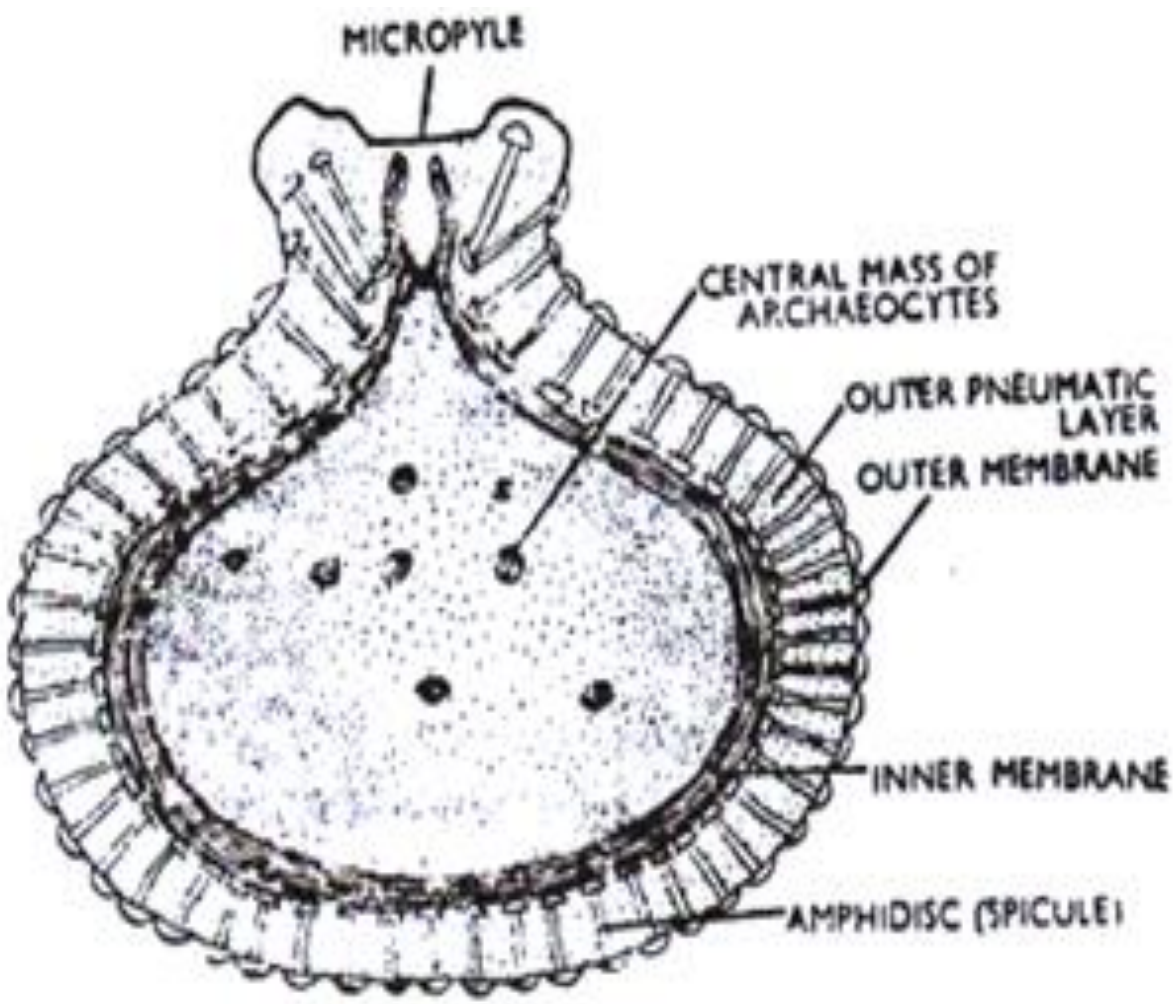


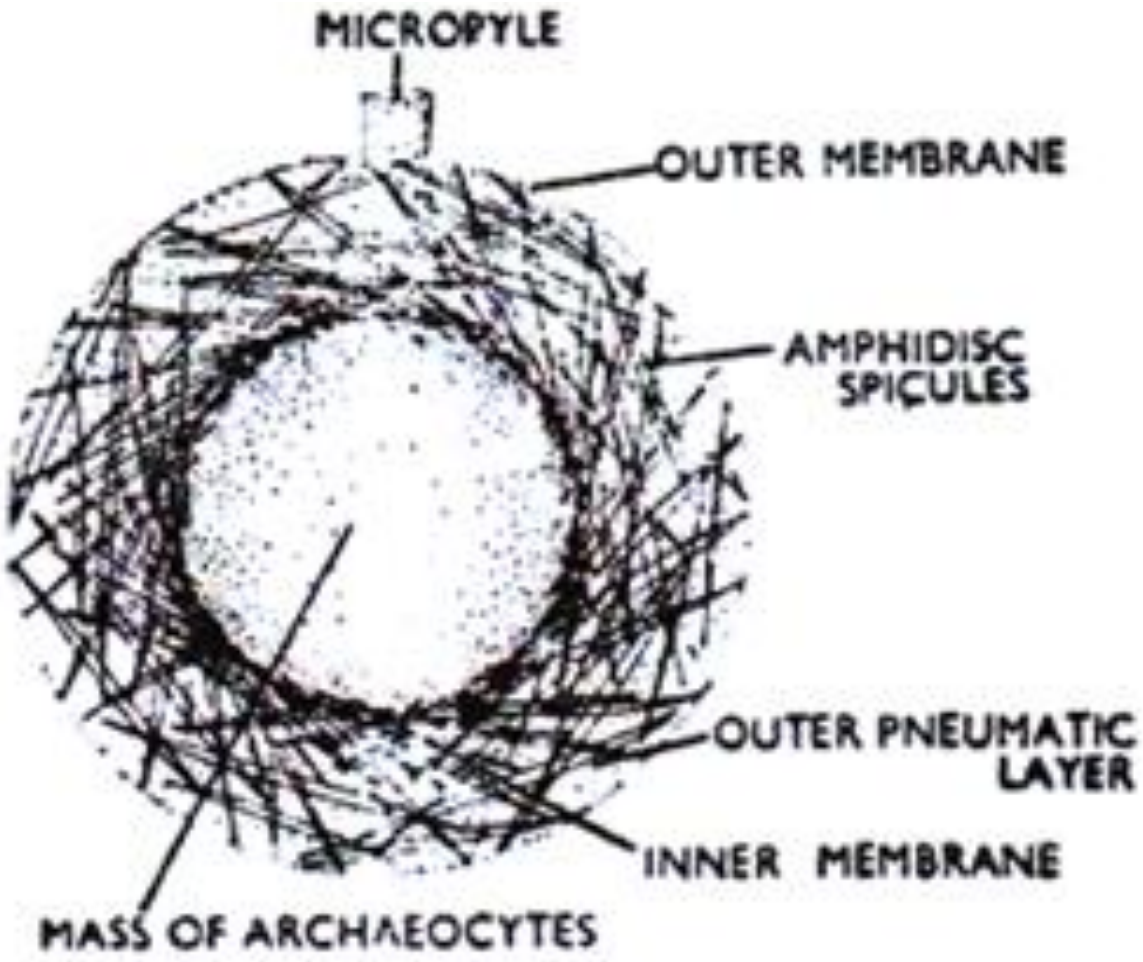
Fig 96 SPICULES

GEMMULE

1. It is the slide of gemmule of a fresh, water sponge.
2. It is the asexual reproductive body.
3. These bodies develop only in unfavourable conditions.
4. It is actually a round ball-like structure comprising of central mass of archeocyte cells and a thick peripheral layer of amphidiscs.
5. Actually speaking the peripheral layer is made up of an outer membrane, a thick pneumatic layer and an membrane.
6. The pneumatic layer is full of air chambers and help in floating.
7. The central mass communicates to outside by a micrpyle.
8. In addition to archeocytes are also present a few trophocytes and scleroblast cells.
9. The trophocytes are full of food in the form of glyco and lipoproteins.
10. The archeocytes are reproductive cells.



(b) Gemmule splitted



(a) Gemmule entire

Fig. GEMMULE

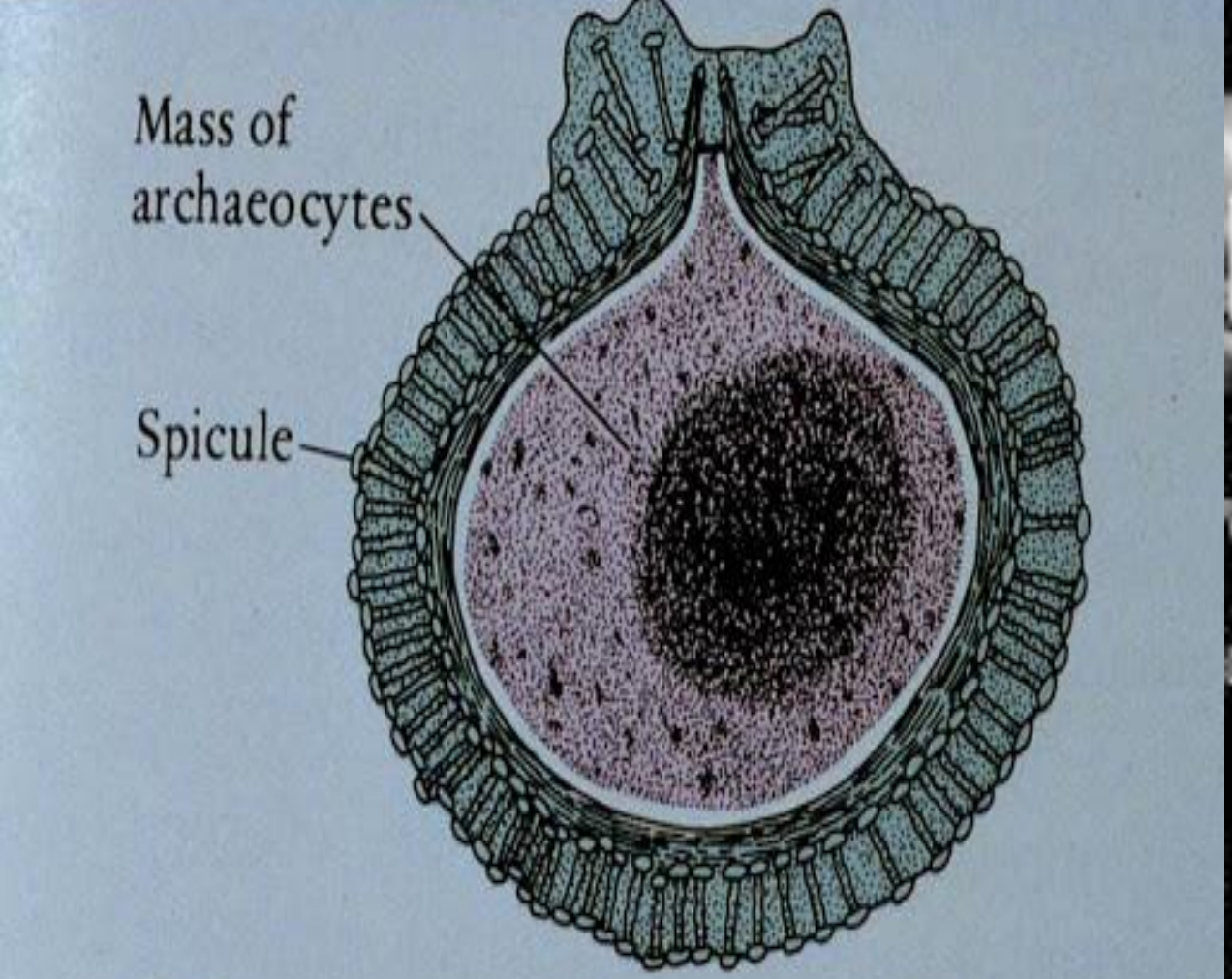
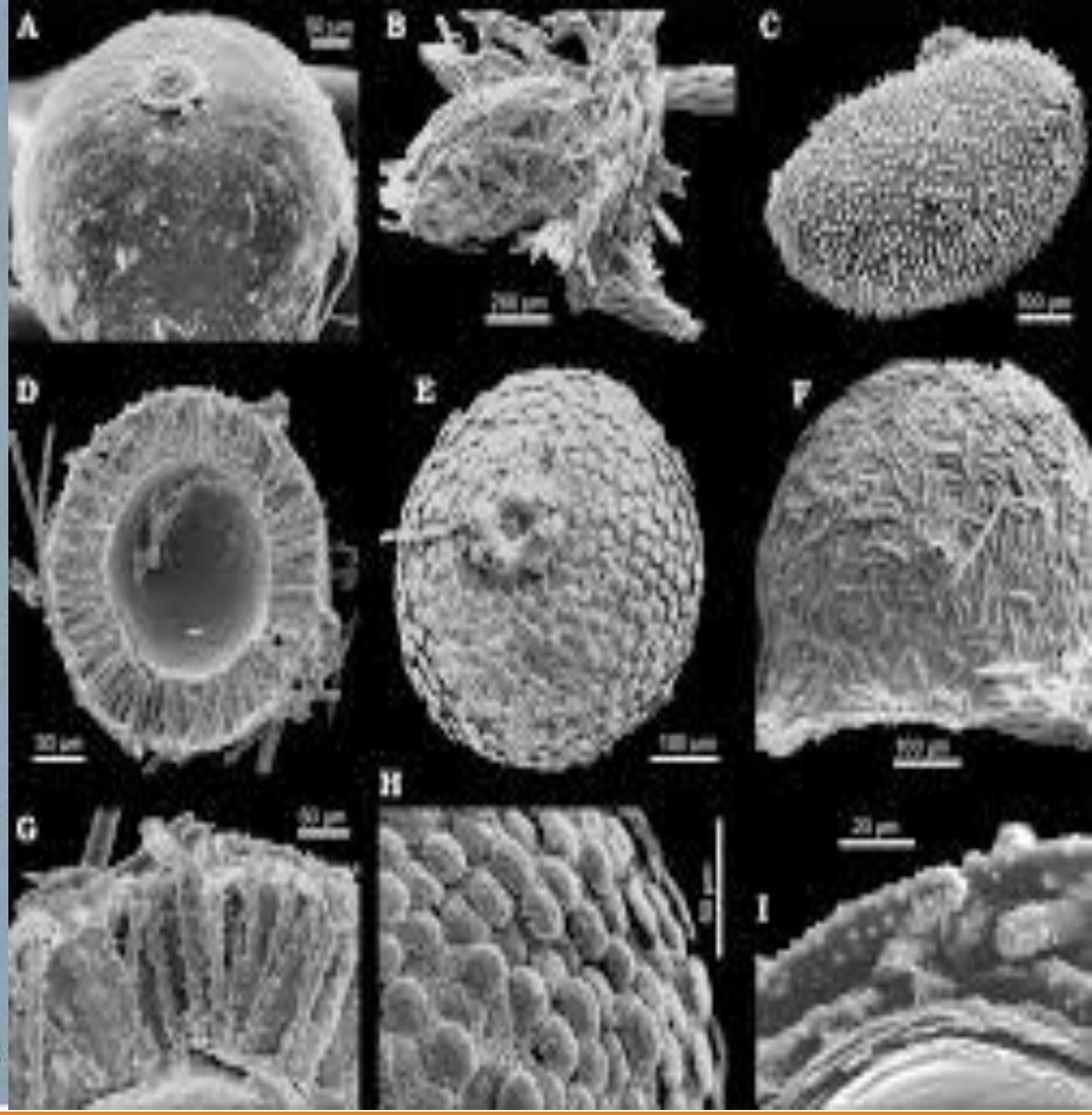


Figure 25.8

Section through a gemmule of a freshwater sponge.



T.S. of *Sycon*

Systematic Position of Sycon

Phylum: **Porifera**

Class: **Calcarea**

Order: **Heterocoela**

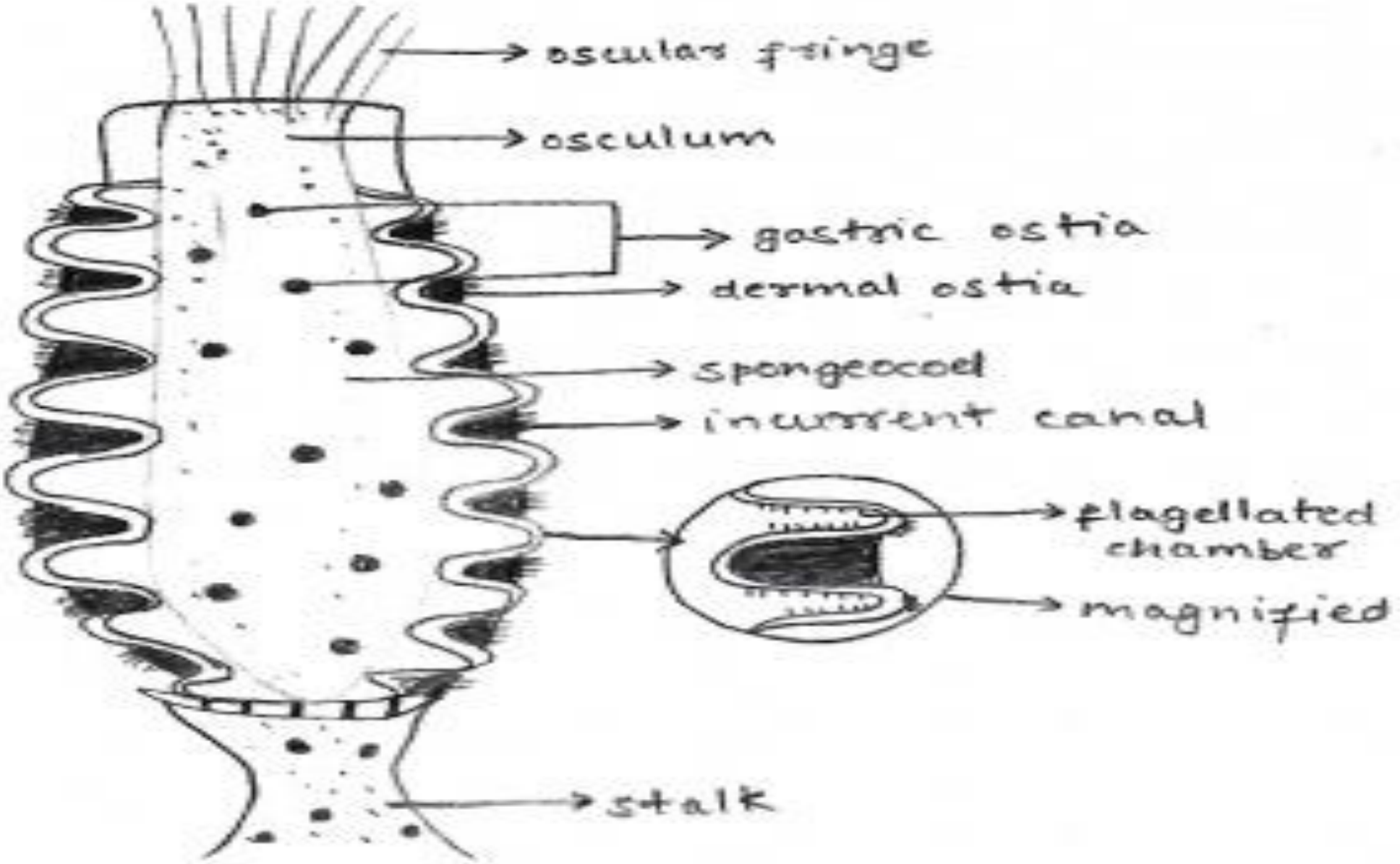
Family: **Sycettidae**

Genus: ***Sycon***

Structure

There is a great diversity observed in the form of sponges ranging from simple to complicated entities. However, they still can be categorized as intermediate when it come to structural diversities. It has branched cylinders which are connected at the basal end, intact to the substratum. The body is flexible though it is secured firmly. A closer look at these entities reveals the presence of many tiny Ostia or inhalant pores. The free end of every cylindrical branch has an opening at the summit known as osculum.

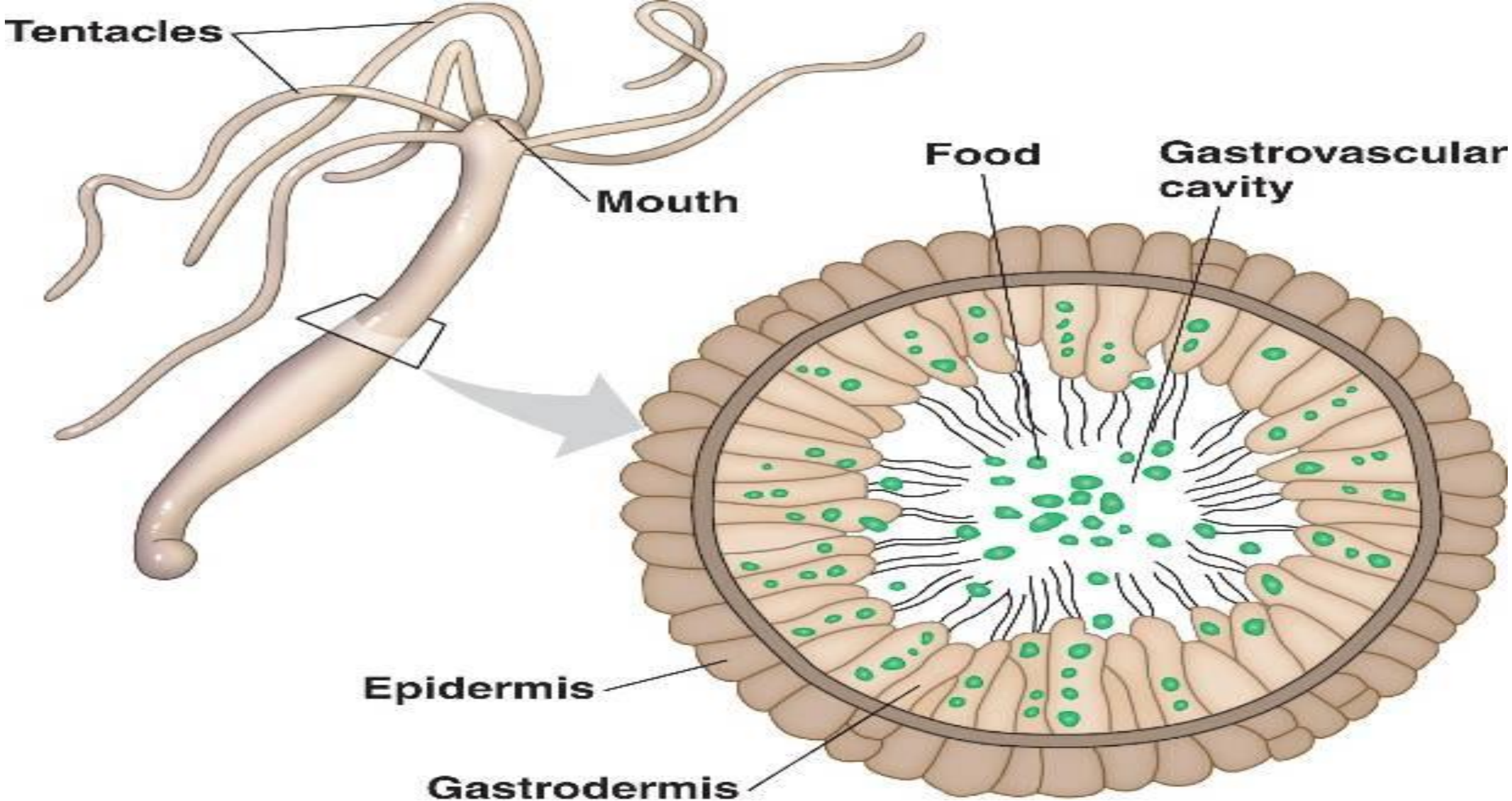
They are fringed with calcareous monaxon spicules or oscular fringes which check the entry of any foreign substance. The body below the osculum is narrow, forming the collar region. The body surface has elevations emerging as spicules (oxeotes) rendering the bristle appearance.


osculars fringe
osculum
gastric ostia
dermal ostia
spongeocoel
incurrent canal
flagellated chamber
magnified
stalk

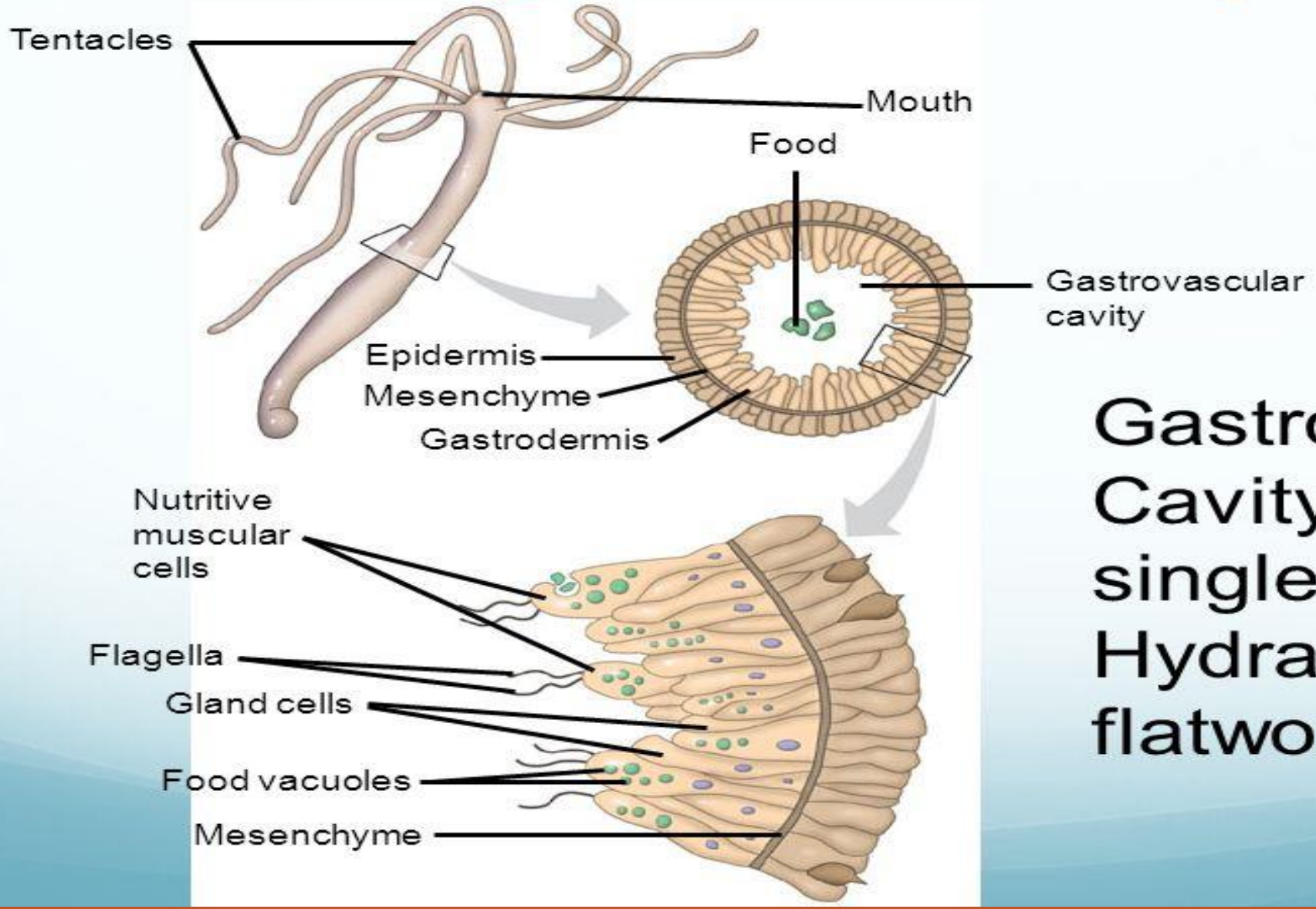
T.S. of Hydra:-

Hydra belongs to the most primitive Class Hydrozoa of Phylum coelenterata . It is simple in form and structure and serves as a good example for the study of coelenterate organization. *Hydra* one solitary, sessile, fresh water animals. They are cosmopolitan in distribution. They occur in lakes, ponds streams and seasonal ditches. They may be found attached to and hanging downward from underside of soiled object in water as leaves, sticks, stones weeds etc.

Hydra is a polyp like or polyploid coelentrate with a tubular or cylindrical body. Body symmetry is typically radial comprising an oral and aboral axis. Aboral end of the body is closed flattered called pedal disc or basal disc used for attachment to substratum. Distal or free end of the body is produced into hypostome having circular mouth. Hypostome bears 6-10 slender contractile and tubular thread like tentaclels that helps in feeding and locomotion. Other structure like testes occurs near the oral end while rounded ovary near aboral end.


Tentacles
Mouth
Food
Gastrovascular cavity
Epidermis
Gastrodermis

Digestion in a hydra

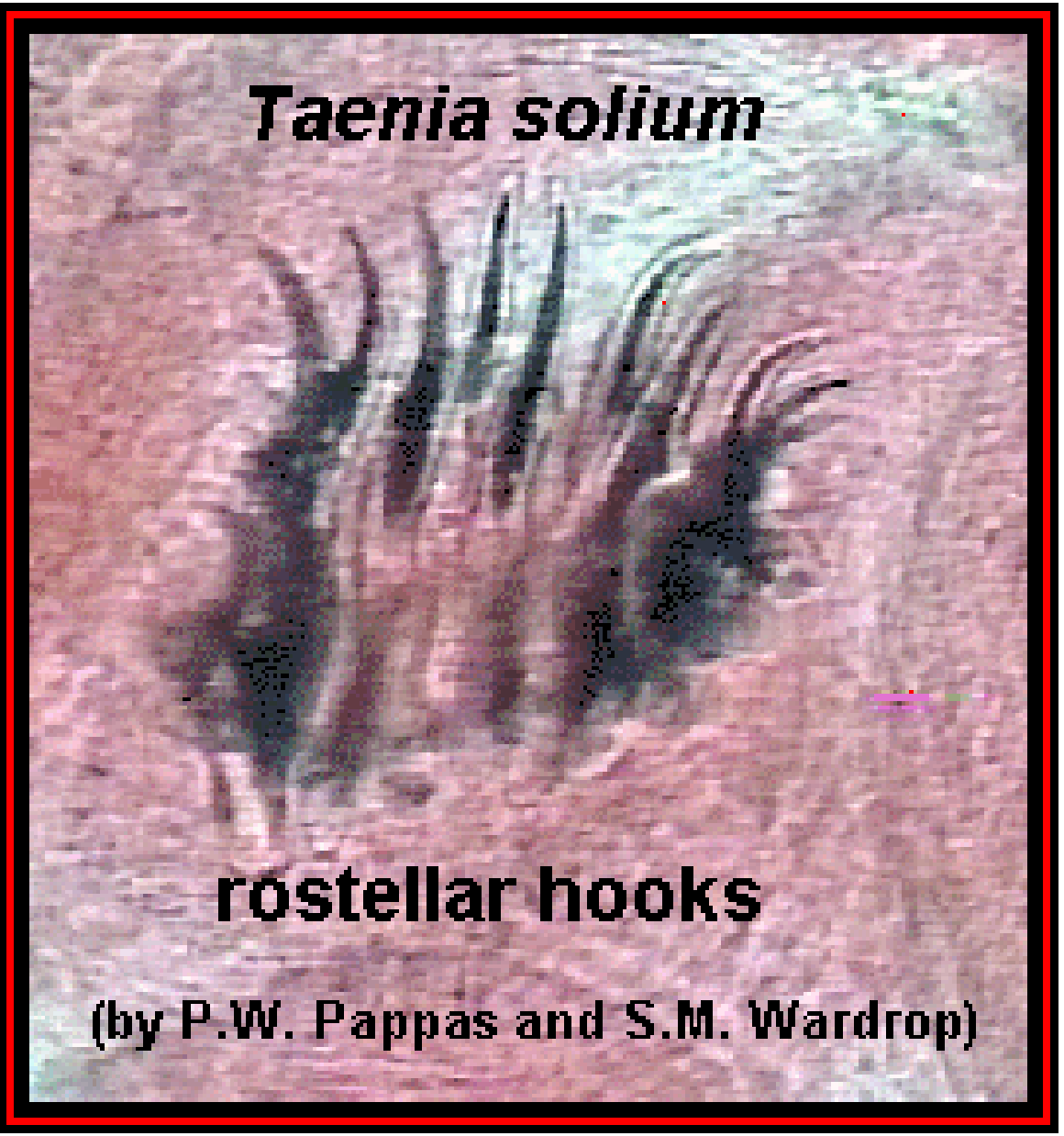


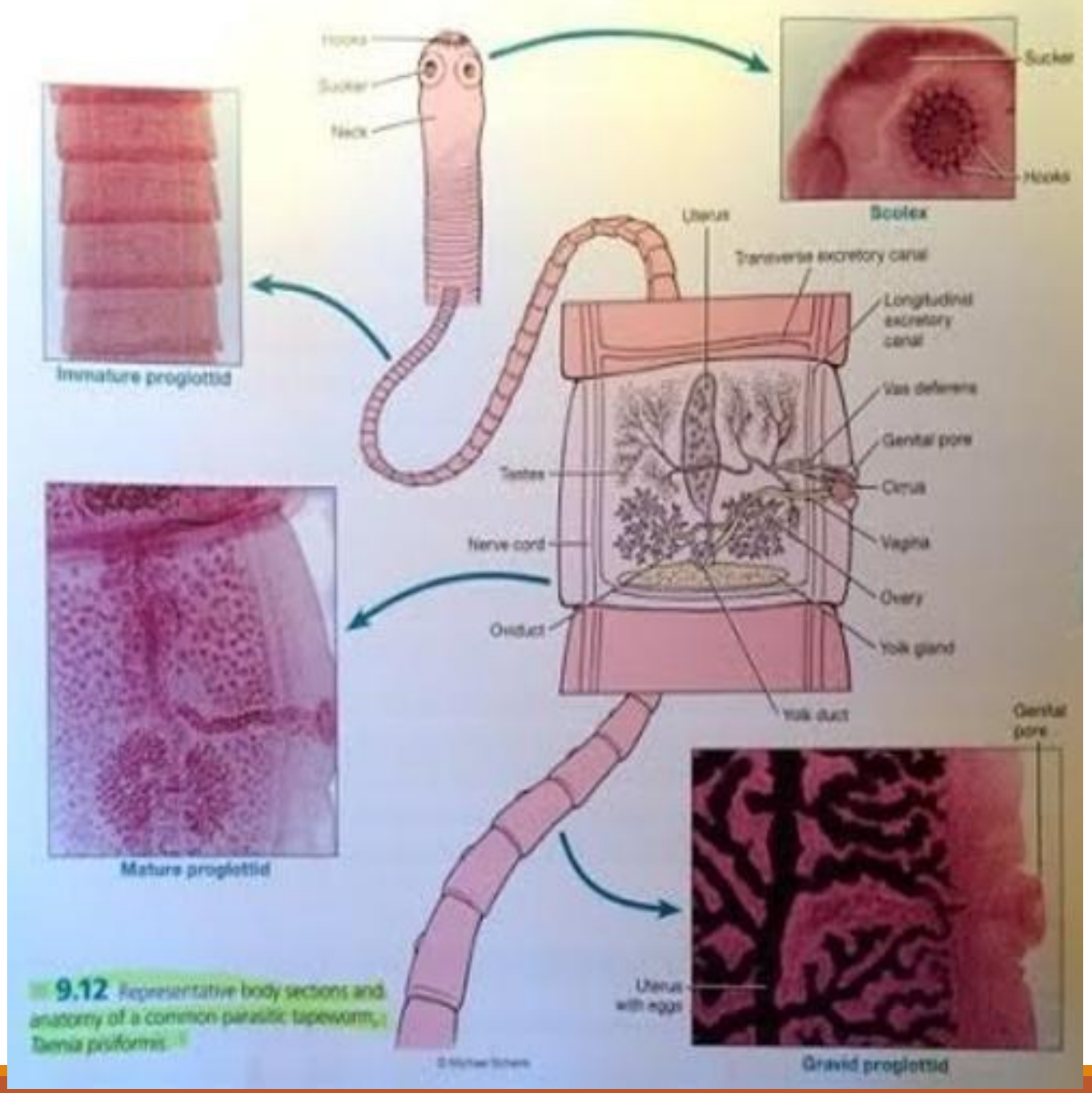
Gastrovascular Cavity - Sac with a single opening – Hydras, Jellies & flatworms

T. solium

T. solium is a flattened ribbon like tapeworm that is white in color. Although it is very morphologically similar to the *T. saginata*, *T. solium* is slightly shorter and have a modified scolex.

The attachment organ, or scolex, has 4 large suckers with a double row of hooks. The adult tape worm grows to be about 6mm in width and 2-7 m in length with about 800 segments called proglottids. As the tapeworm grows in the intestine, mature proglottis called gravid proglottis will be casted off out of the human body. Each gavid proglottids contains both male and female reproductive organs and houses 30-40 thousand eggs. The eggs are indistinguishable between *T.solium* and *T. saginata* as they both measure 31-43 micrometers and contain an embryo (an oncosphere)


Taenia solium
rostellar hooks
(by P.W. Pappas and S.M. Wardrop)


Hooks
Sucker
Neck
Scolex
Immature proglottid
Uterus
Transverse excretory canal
Longitudinal excretory canal
Vas deferens
Genital pore
Testes
Cirrus
Nerve cord
Vagina
Ovary
Oviduct
Yolk gland
Yolk duct
Mature proglottid
Genital pore
Uterus with eggs
Gravid proglottid
9.12 Representative body sections and anatomy of a common parasitic tapeworm, Taenia pisiformis

TAENIA SOLIUM

The armed scolex of T. solium (note hooks on top of scolex). *CDC*

- *T. solium* has a scolex (A) with four suckers and a double crown of hooks, a narrow neck, and a large strobila (2-4 m) (B) consisting of several hundred proglottids.
- About 2 months after ingestion, proglottids begin to detach from the distal end and are excreted in the feces.
- Each segment contains 50-60,000 fertile eggs.

Taenia pisiforme, Scolex. Hakenkranz ähnlich dem der T. solium (Mit freundlicher Genehmigung Roche AG): http://www.infektionsnetz.at/test/bilder/mikroskop/taenia_pisiforme_r.jpg

The Lancet (2003) 361: 547

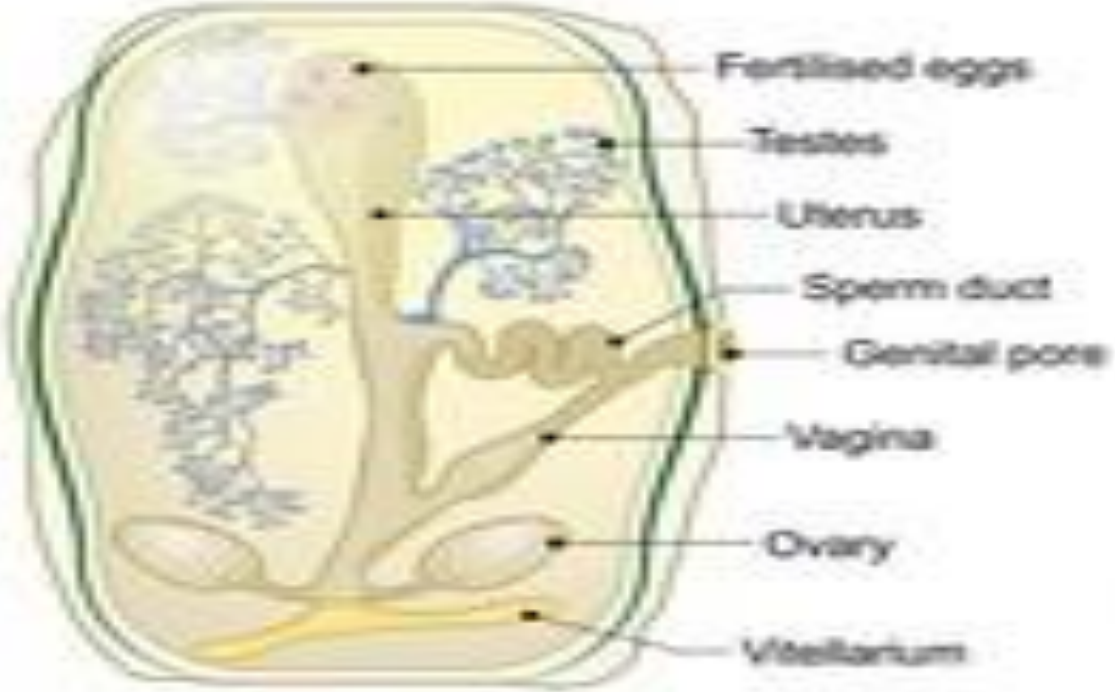
GRAVID PROGLOTTID :-

We define a **gravid proglottid** as one that contains uterine branches filled with eggs. An immature **proglottid** is defined as one that does not have a fully mature reproductive system and is without eggs.

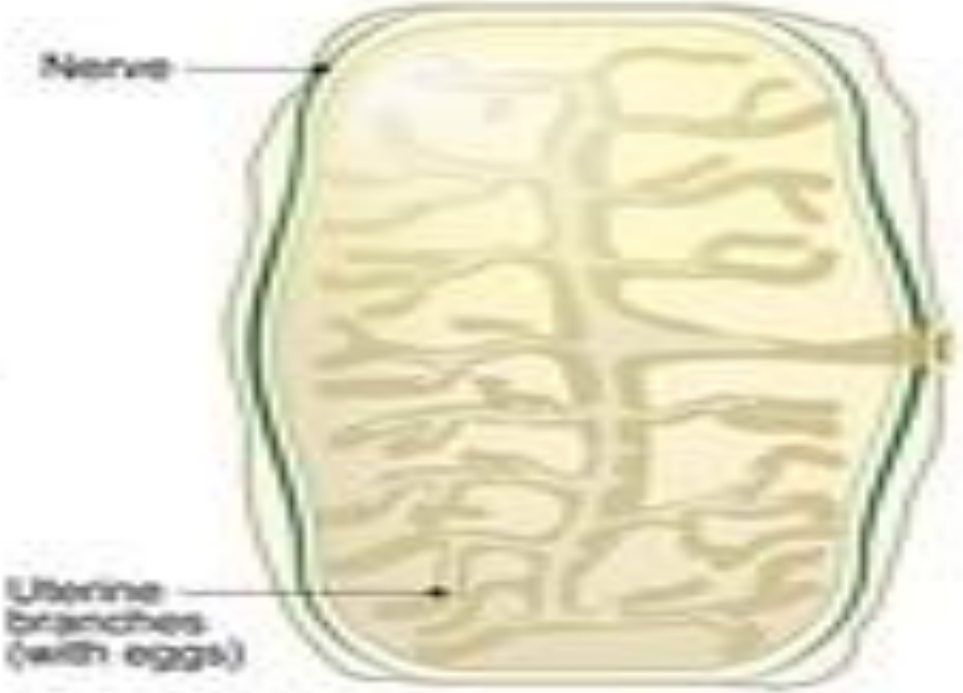
The adults produce **proglottids** which mature, become **gravid**, detach from the tapeworm, and migrate to the anus or are passed in the stool (approximately 6 per day). **T. saginata** adults usually have 1,000 to 2,000 **proglottids**, while **T. solium** adults have an average of 1,000 **proglottids**.

TAPEWORMS

SEXUALLY MATURED PROGLOTTID



GRAVID PROGLOTTID



Which of the following are true with reference to taxonomical aids?

1. Separate taxonomic keys are requried for each taxonomic category.
2. Herbarium is a store house of collected plant and animal specimens.
3. Each statement in the key is called couplet.
4. Keys are used for identification purpose.

Using a **taxonomic key**. A **key** is a device, which when properly constructed and used, enables a user to identify an organism.

There are three **types** of **keys** that we will discuss;

(a) **dichotomous**;

(b) Polyclave (also called multiple access or synoptic); and

(c) probability.

TAXONOMICAL AIDS

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- A taxon is a defined group of organisms typically treated at a given rank.
- In the above example , Magnoliophyta is taxon placed at a rank of phylum.
- Lillopsida is a taxon placed at the rank of class and so on.
- As one progresses down the hierarchy , the number of organism in each taxon decreases , and the similarities between them increases.

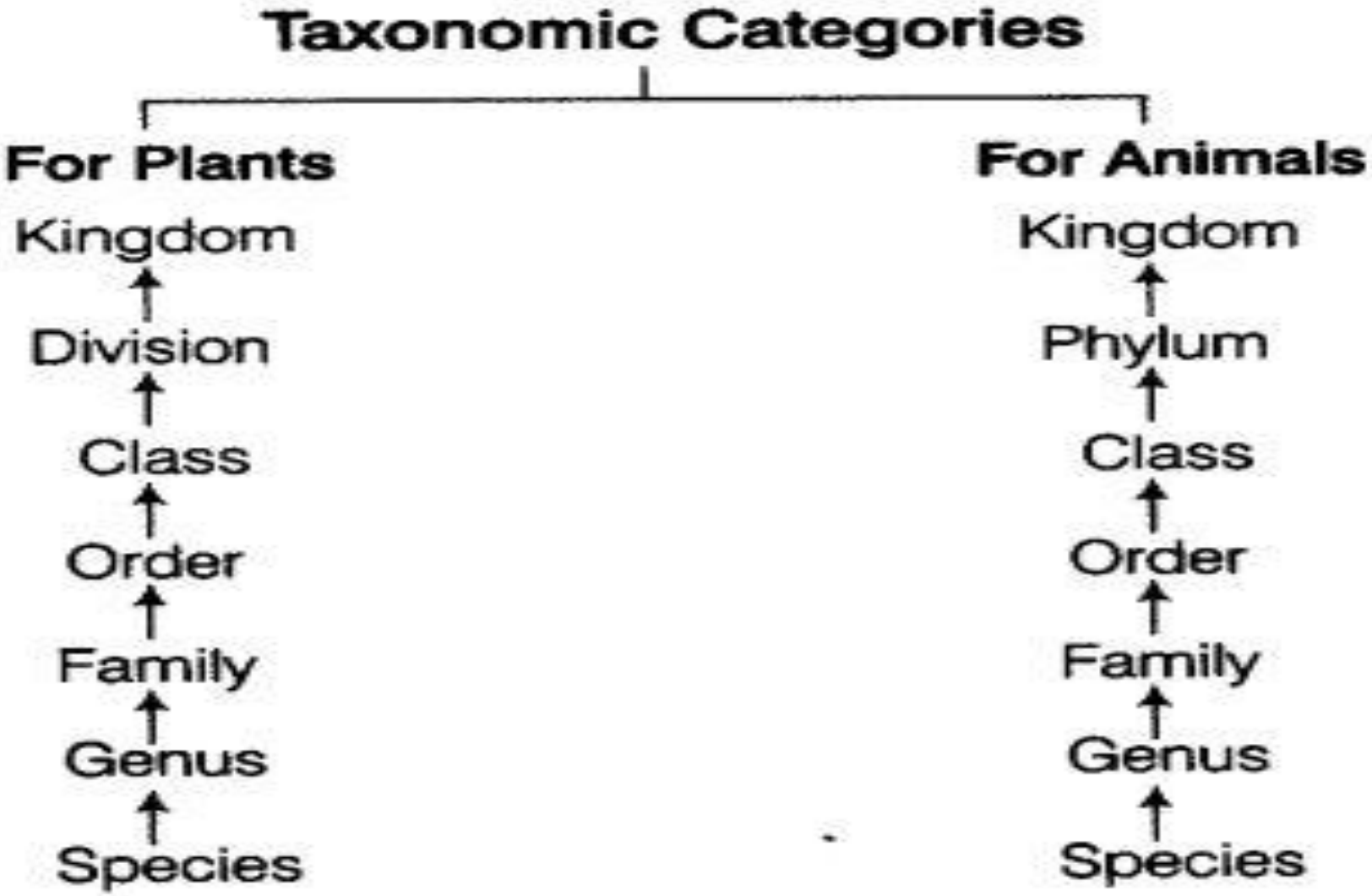

Fig. 1.3 Taxonomic categories showing hierarchial arrangement in ascending order

Visit to Zoological survey of India/ Museum/National Park

Zoological Survey of India was established in 1916 to promote the survey, exploration and research of the fauna in the country. It is the government unit which keeps the record of animal species under its area. The Zoological Survey of India has 16 regional labs distributed all over India.


Thank you