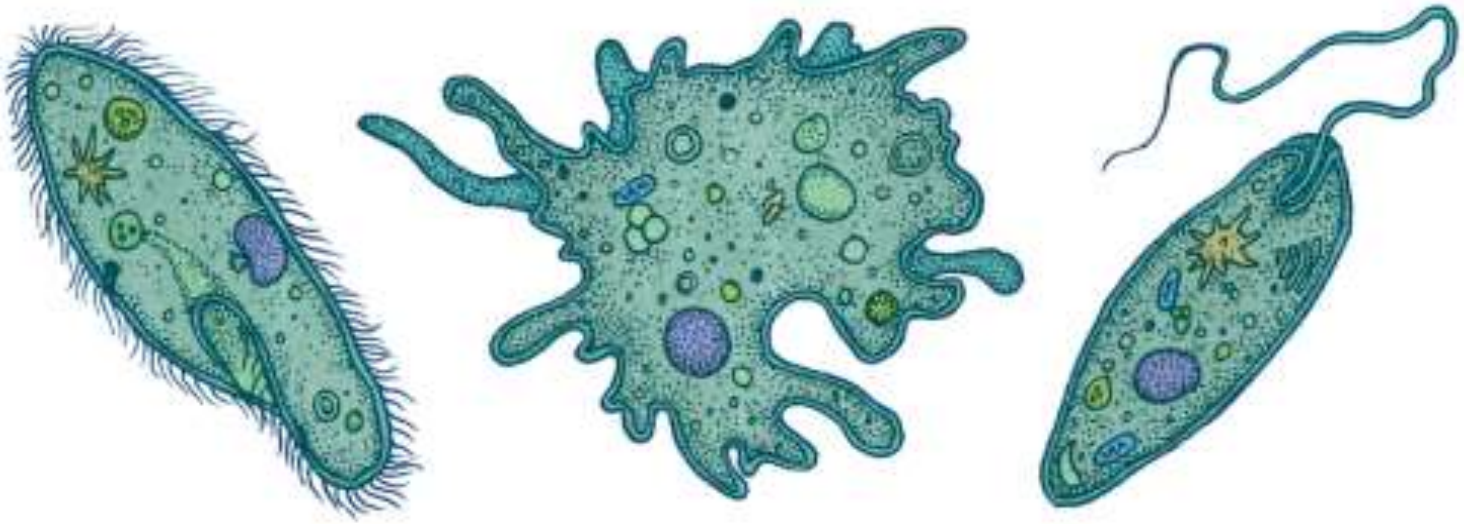
PROTOZOA CLASSIFICATION



Subkingdom :- *Protozoa*

Characters :-

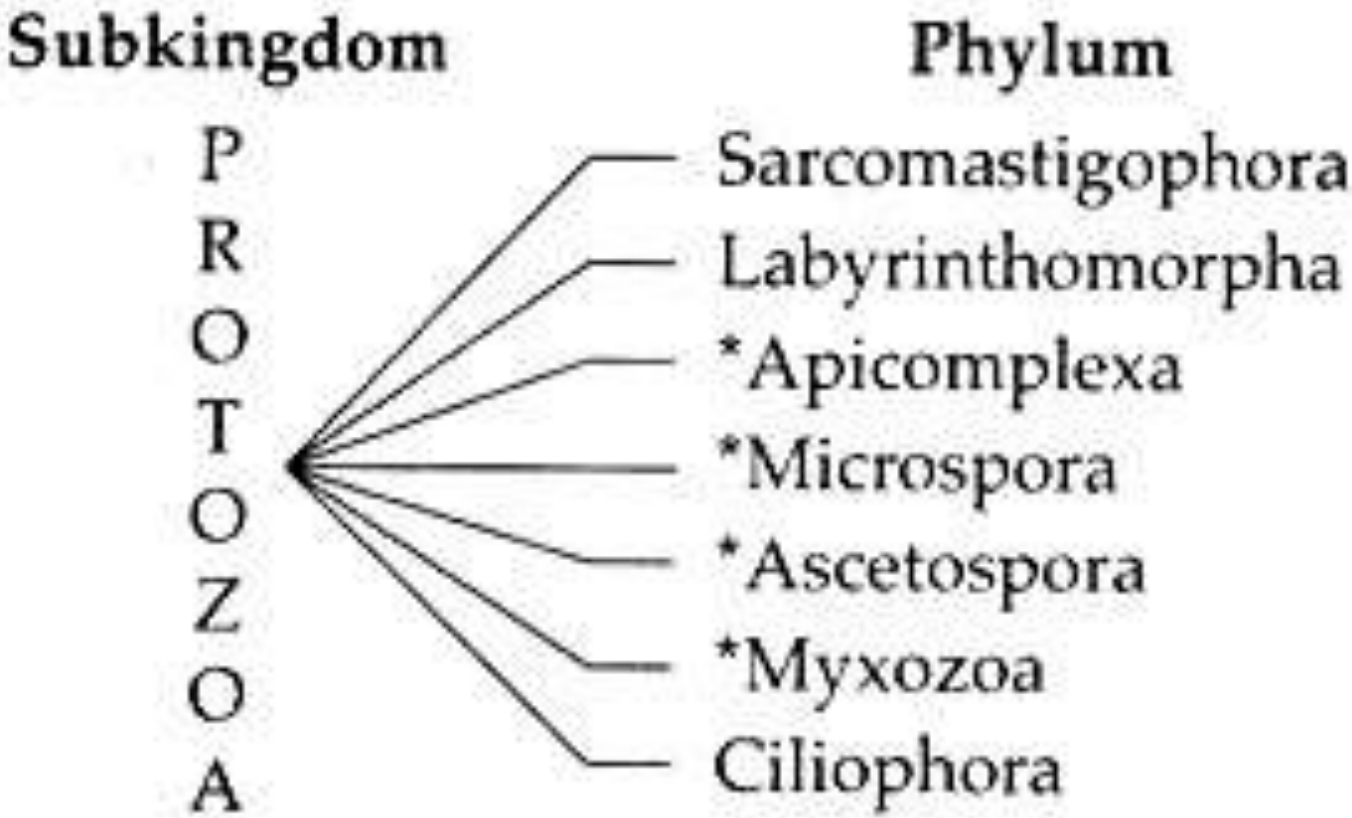
(i) They are usually microscopic & single celled animal & the single cells performs all the vital activities of the body.

(ii) Body may be naked or covered by pellicle or enclosed in a shell.

(iii) Main locomotory organs are pseudopodia, flagella or cilia (in sporozoa well define locomotory organs are absent).

(iv) Nucleus single or multiple, which in sac like, oval or biconvex & contains a thick endosome.

Levine et.al (1980)



Phylum Sarcomastigophora:

i. Nucleus is of one type, except in heterokaryotic Foraminifera.

ii. Locomotory organs are either pseudo- podia or flagella or both.

iii. Reproduction asexually, but when sexually it is essentially by syngamy.

iv. This phylum includes three sub- phyla — Mastigophora, Opalinata and Sarcodina.

Examples:

Mastigophora — Trypanosoma, Euglena (Fig. 1.1A), Volvox, Giardia (Fig. 1.1D), Leishmania, Crypto-monas.

Opalinata — Opalina (Fig. 1.1B), Protoopalina (Fig. 1.1C).

Sarcodina — Amoeba (Fig. 1.6), Entamoeba (Fig. 1.1E), Elphidium

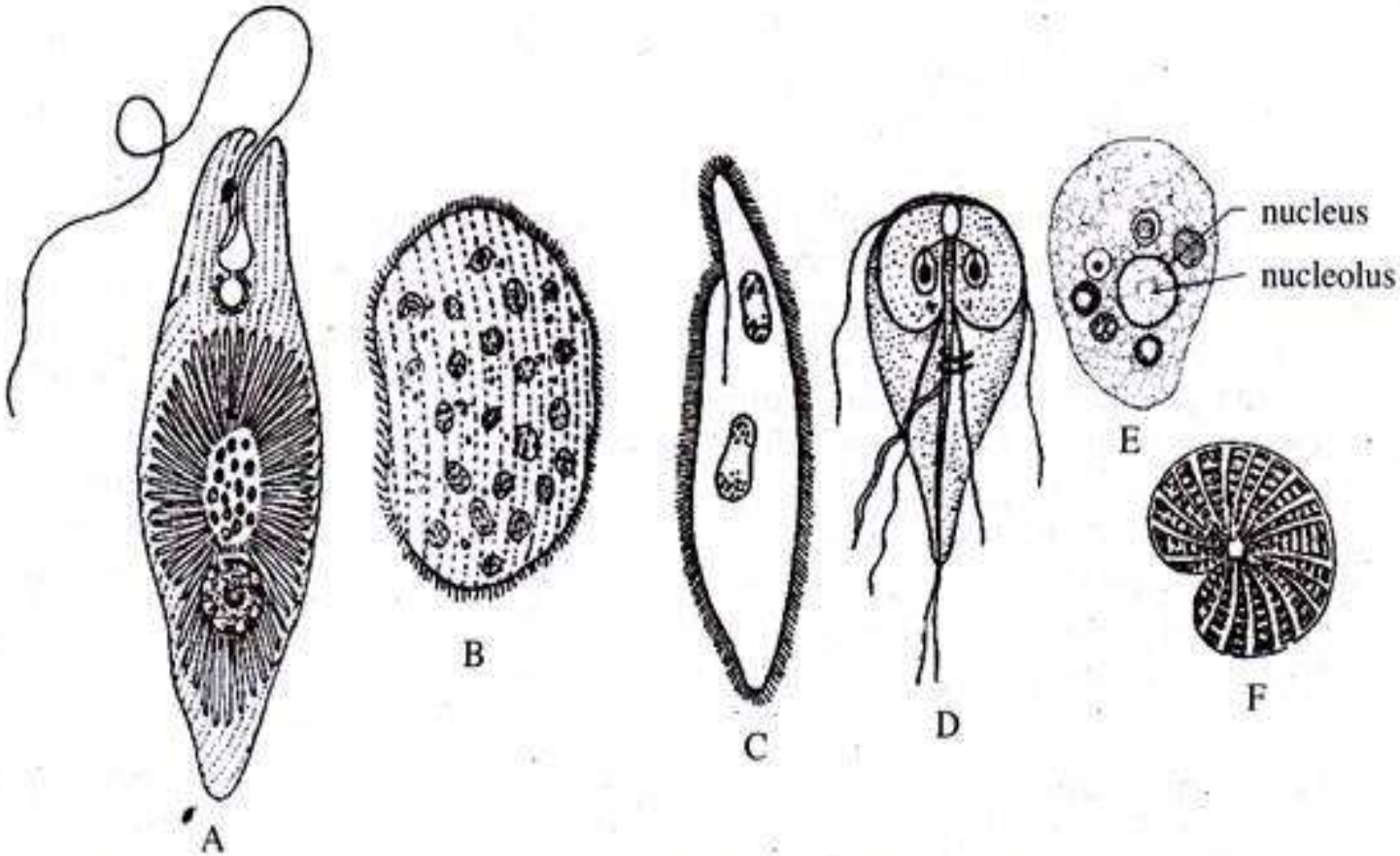


Fig. 1.1 : Some members of the phylum – Sarcomastigophora. A. *Euglena*; B. *Opalina*; C. *Protoopalina*; D. *Giardia*; E. *Entamoeba histolytica* and F. *Elphidium*.

Phylum Labyrinthomorpha:

i. Mostly inhabitants of marine and estuarine water.

ii. Trophic stage having ectoplasmic network, with spindle shaped or spherical, non-amoeboid cells.

iii. In some genera, however, amoeboid cells move within the cytoplasmic network by gliding.

iv. Unique cell-surface organelle, associated with ectoplasmic network.

v. Saprophytic and parasitic on algae.

Examples:

Labyrinthula, Labyrinthomyxa

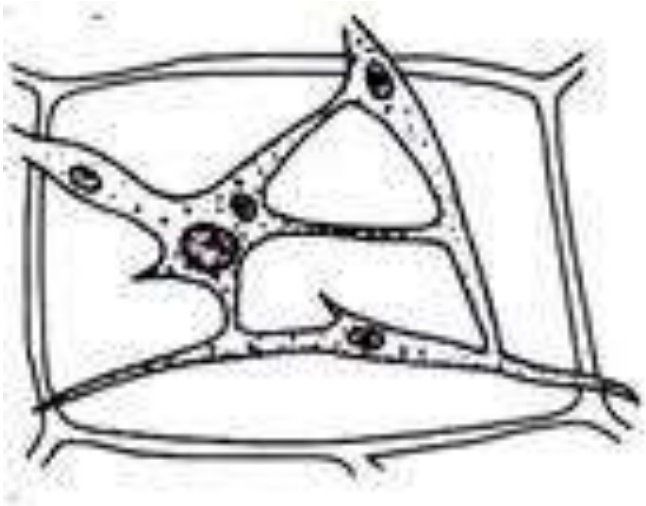


Fig. 1.2 : *Labyrinthomyxa.*

Phylum Apicomplexa:

i. All species are parasitic in nature.

ii. Anterior part of the body forms apical complex.

iii. This apical complex is made up of polar rings, rhoptries, micronemes, conoid and subpellicular microtubules.

iv. Microspores generally present at some stage.

v. They reproduce sexually by syngamy.

Examples:

Monocystis, Gregarina , Plasmodium, Babesia, Perkinsus.

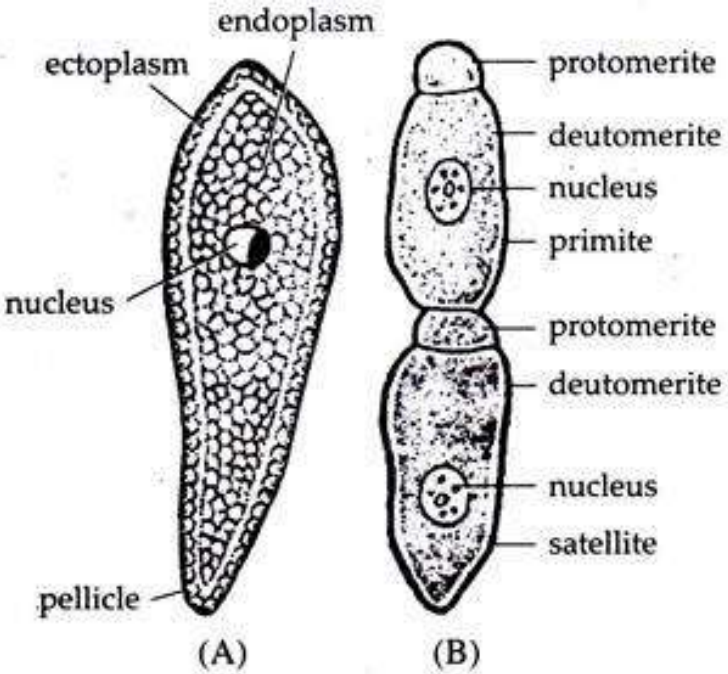


Fig. 1.3 : (A) *Gregarina blattarum*. (B) Two sporadins attached end to end, an association called **syzygy**. The first individual is known as primite and the other satellite.

Phylum Microspora:

i. Obligatory intracellular parasites found in nearly all major animal groups.

ii. Spores unicellular, each with imperforate wall, containing one uninucleate or di-nucleate sporoplasm.

iii. Spore is with simple or complex extrusion apparatus associated with polar tube and polar cap.

iv. Mitochondria absent in spores.

Nosema (Fig. 1.4), Burkea, Hessea, Candospora.

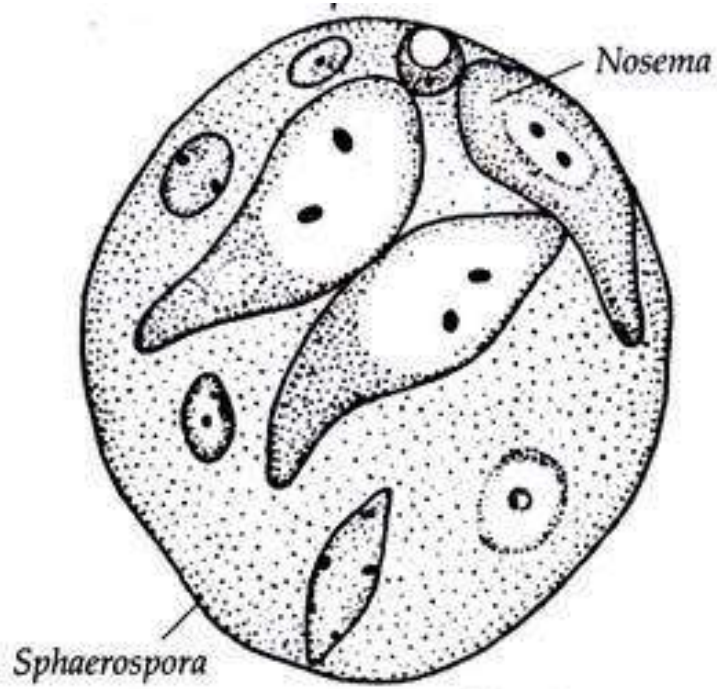


Fig. 1.4 : A unique example of hyperparasitism. A trophozoite of Sphaerospora polymorpha is infected by trophozoites of *Nosema notabilis*.

Phylum Ascetospora:

i. All are parasitic.

ii. In most of the cases spores are multicellular.

iii. Spores with one or more sporoplasm.

iv. Spores without polar capsules or polar filaments.

Examples:

Haplosporidium, Coelosporidium, Paramyxa, Marteilia.

f. Phylum Myxozoa:

i. All species are parasitic.

ii. Spores are of multicellular origin, with one or more polar capsules and sporoplasms.

iii. Each spore with 1, 2 or 3 (rarely more) valves.

Examples:

Myxidium, Myxobolus, Trilospora, Triactinomyxon.

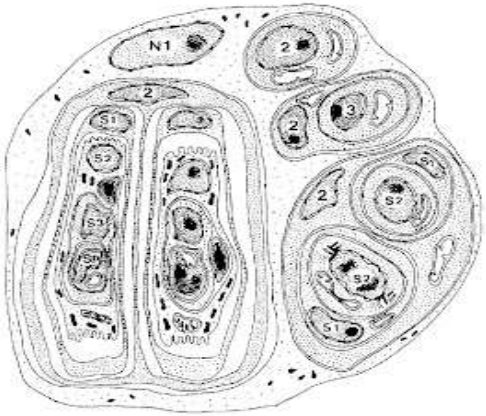


Fig. 11. The development of *Paramyxa paradoxa*. Only 2 of the 4 spores are figured in the young sporogenetic sporont (bottom right) and in the mature one (bottom left). S1, S2, S3, Sp, nuclei of sporal cells 1, 2, 3 and sporoplasm. The small dark cell visible in the mature spore is interpreted as the polar globule rejected before the differentiation of the haploid sporoplasm.

Desportes 1984 Origins of Life

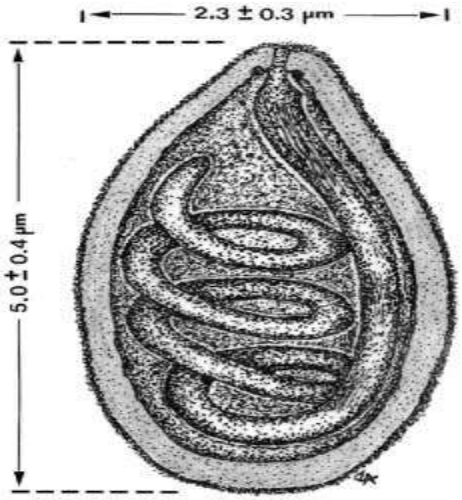


Fig. 13: semischematic drawing of the polar capsule of *Myxidium volitans* sp. nov. and the arrangements of the polar filament coils obtained by serial ultrathin section observations.

Phylum Ciliophora:

i. Most of the species are free living, quite a number are commensal, some truly parasitic and a large number are found as symphorionts on variety of hosts.

ii. Simple cilia or compound ciliary organelles are present in at least one stage of life cycle.

iii. Subpellicular cilia is present even when surface cilia is absent.

iv. Nuclei are of two types.

v. Presence of typical contractile vacuole.

vi. Nutrition heterotrophic.

vii. Asexual reproduction by transverse binary fission, basically homothetogenic and generally parakinetal, but budding and multiple fission also occur.

viii. Sexual reproduction involves conjugation, autogamy and cytogamy.

Examples:

Paramoecium (Fig. 1.15), Balantidiuma (Fig. 1.5E), Vorticella (Fig. 1.5A and B), Nyctotherus (Fig. 1.5C), Tetrahymena, Nassula, Podophrya, Prorodon (Fig. 1.5D).

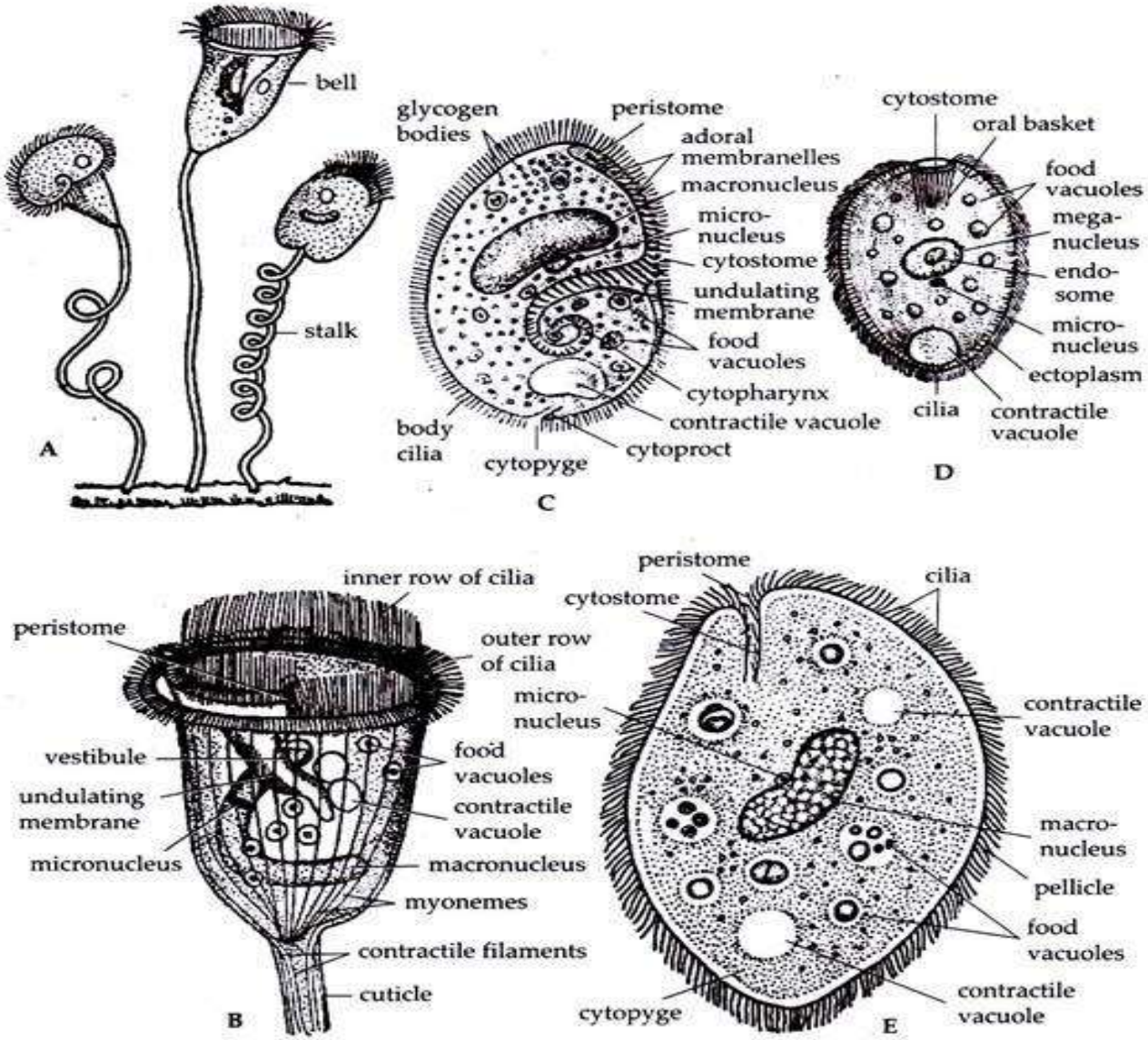
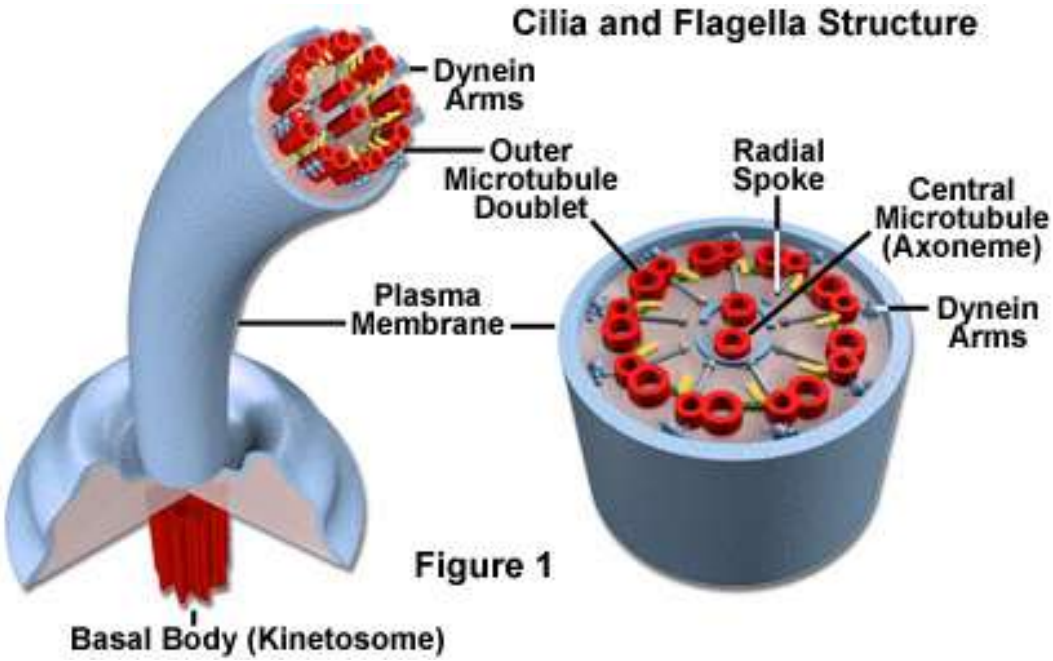
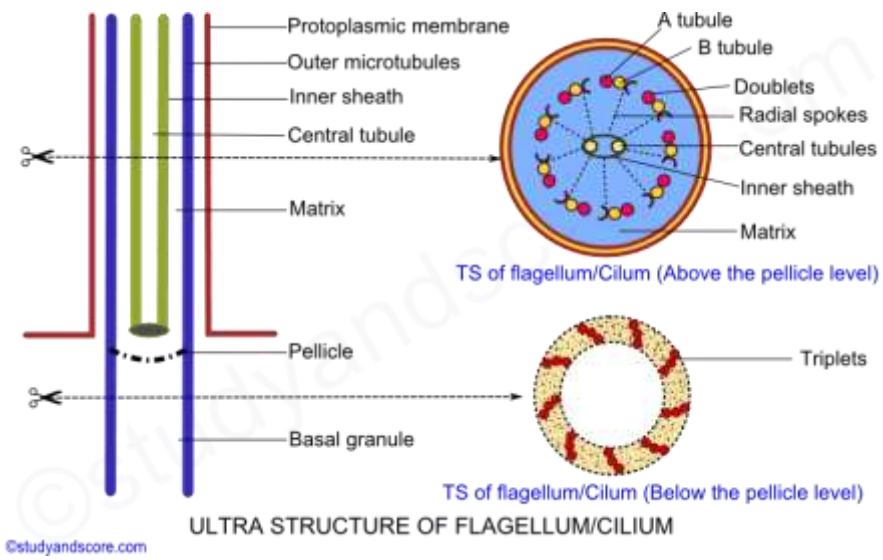
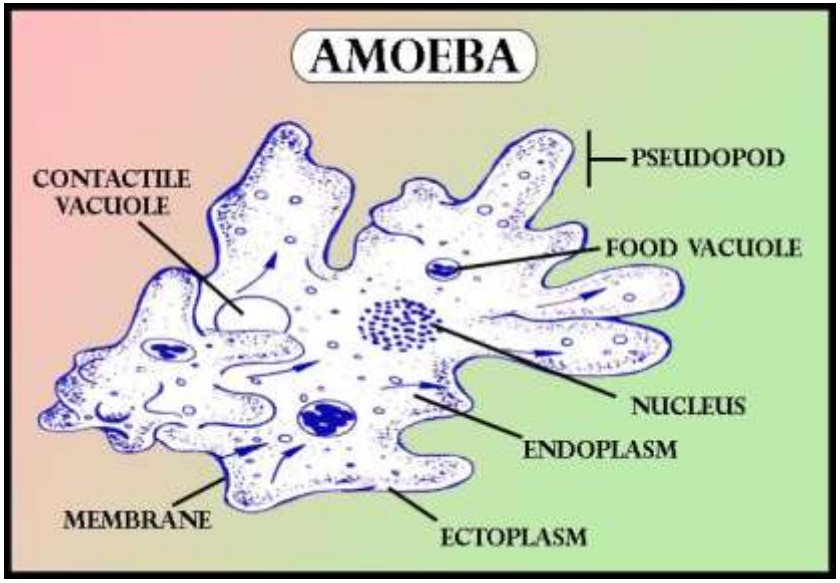


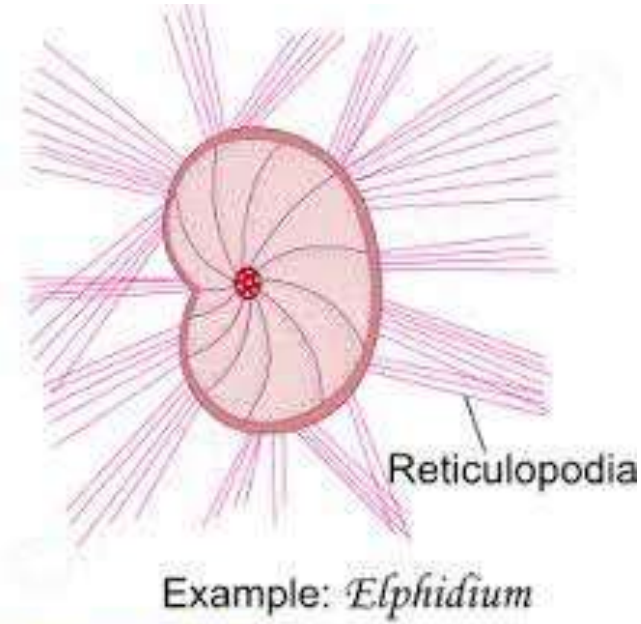
Fig. 1.5 : A. a group of *Vorticella* at various states of contraction of their stalks. B. Magnified view of the upper end of *Vorticella*. C. *Nyctotherus*. D. *Prorodon*, E. Trophozite of *Balantidium*.



9+2 arrangement




AMOEBA
CONTACTILE VACUOLE
PSEUDOPOD
FOOD VACUOLE
NUCLEUS
ENDOPLASM
MEMBRANE
ECTOPLASM


Reticulopodia
Example: *Elphidium*
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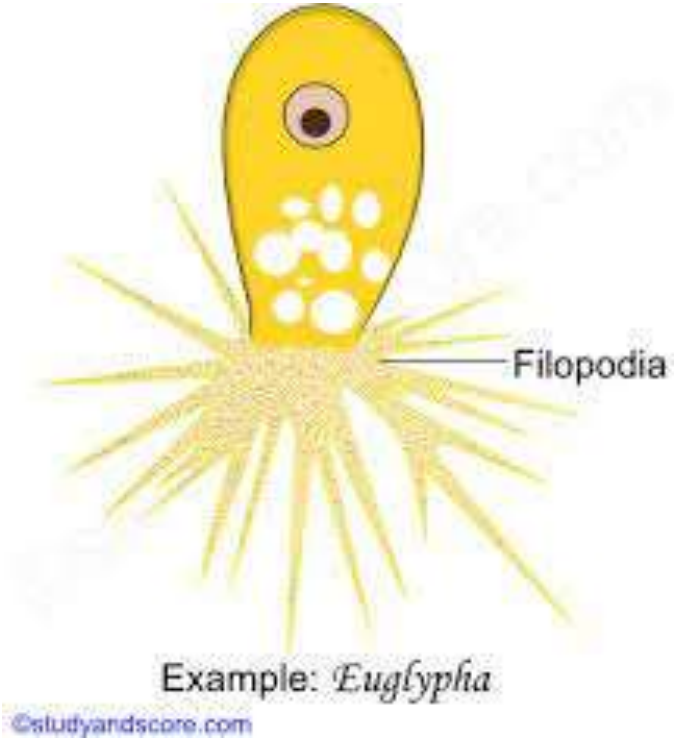
Filopodia
Example: *Euglypha*
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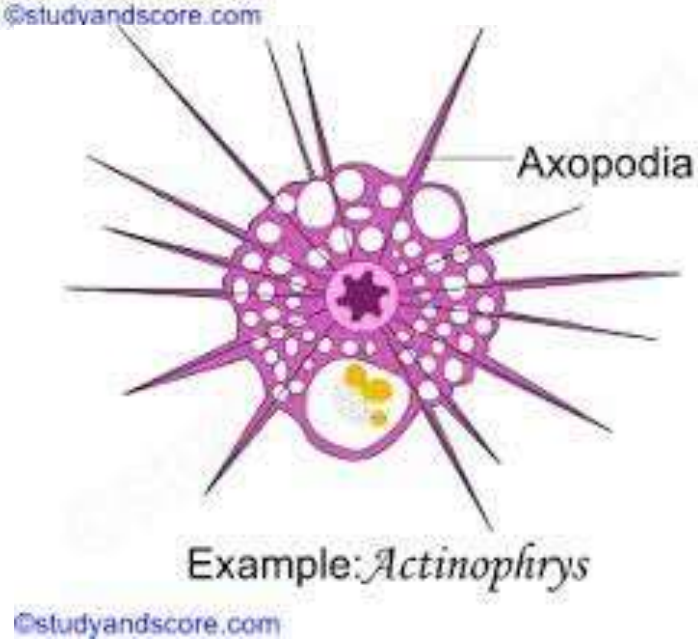
Axopodia
Example: *Actinophrys*
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