

Phylum- Protozoa



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Phylum- Protozoa

General characters :

- ❖ Protozoans are microscopic and acellular animals. All the physiological activities are performed within a single cell by specialized parts of cytoplasm called as cell organelles.
- ❖ They are terrestrial, aquatic, free living or parasitic.
- ❖ Protozoans exhibit a great variety of shape such as spherical, oval or flattened.
- ❖ Body naked or covered by pellicle layer but in some forms body is covered by shells and often provided with internal skeleton..
- ❖ The nutrition in protozoa may be holophytic (like plant) and holozoic (animal like), saprozoic or parasitic.
- ❖ The cytoplasm may be differentiated into an outer ectoplasm and inner endoplasm.
- ❖ Locomotory organs are pseudopodia in **Rhizopoda**, flagella in **Flagellates**, Cilia in **Ciliates** and absent in **Sporozoa**.
- ❖ Respiration by general body surface.

- ❖ Excretion by general body surface but in some forms through a temporary opening called cytopyge as well as contractile vacuoles.
- ❖ Reproduction asexual and sexual. Sexual reproduction takes place by conjugation process.
- ❖ The formation of cyst or protective wall under unfavourable condition of nature.
- ❖ Life cycle often exhibits alternation of generation i.e. It includes asexual and sexual phases.

Classification of Protozoa

- Protozoa are classified on the basis of their motility and method of reproduction
- They are classified into Four main types
 - Flagellates
 - Ciliates
 - Sarcodina
 - Sporozoates

PROTOZOA

Sarcodina

Amoeba

Flagellata

Leishmania,
Trypanosoma,
Giardia,
Trichomonas

Sporozoa

Plasmodium,
Sarcocystis,
Cryptosporidium,
Toxoplasma,
Babesia, Isospora

Infusoria

Balantidium

PHYLUM

Protozoa

SUBPHYLUM

Sarcomastigophora

Sporozoa

Cnidospora

Ciliophora

SUPER CLASS

1. Mastigophora

CLASS

Phytomastigophora

Eg: Euglena, Ceratium, Noctiluca

Zoomastigophora

Eg: Leishmania, Trichomonas, Trypanosoma, Trichonympha

2. Opalinata

Eg: Opalina, Zelleriella

3. Sarcodina

Rhizopodea

Eg: Amoeba, Entamoeba, Elphidium

Piroplasma

Eg: Babesia

Actinopodea

Eg: Actinophrys, Collozoum

Teleospora

Eg: Monocystis, Eimera, Plasmodium

Toxoplasmea

Eg: Toxoplasma

Haplosporea

Eg: Haplosporidium

Myxosporidea

Eg: Myxobolus

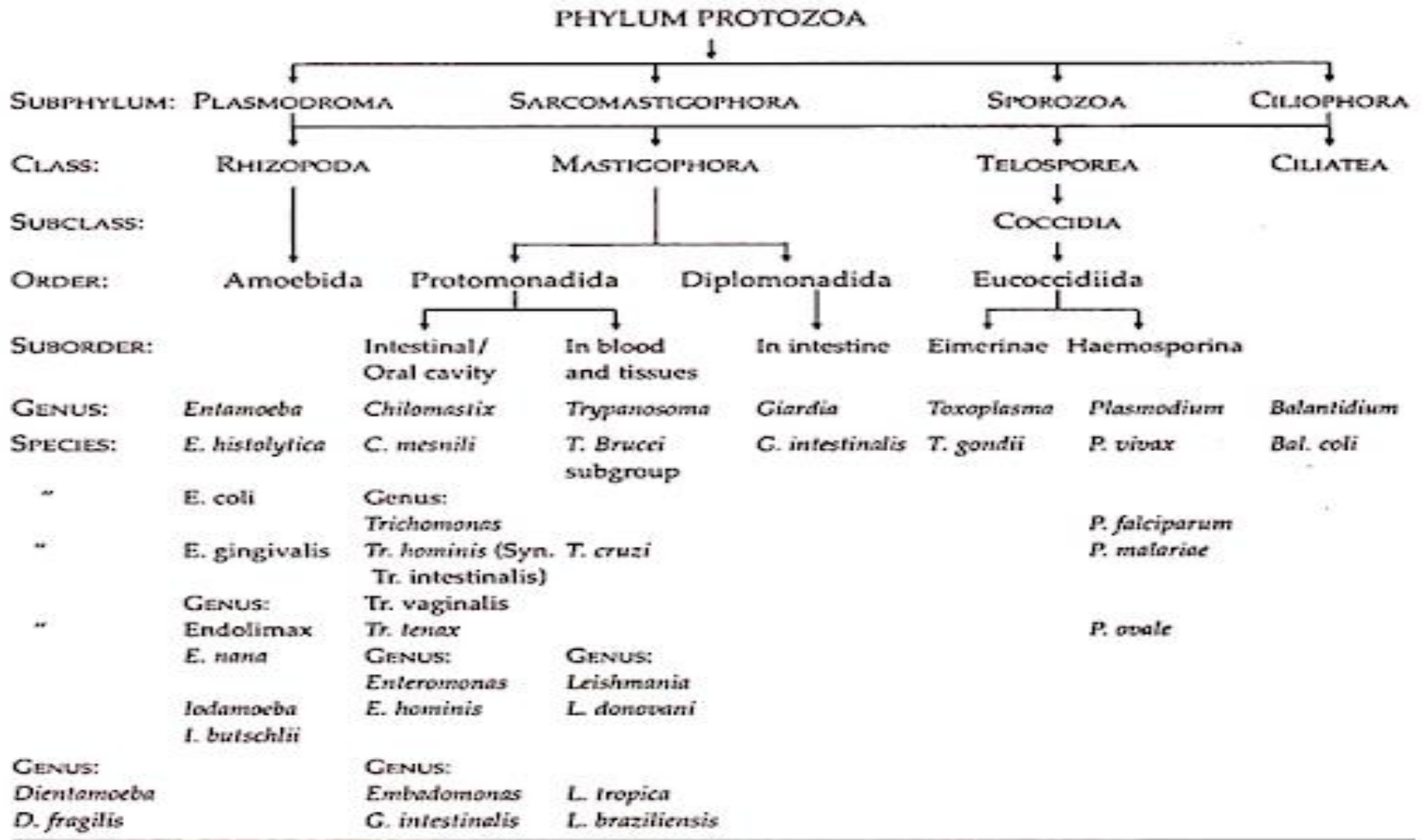
Microsporidea

Eg: Nosema bombicis

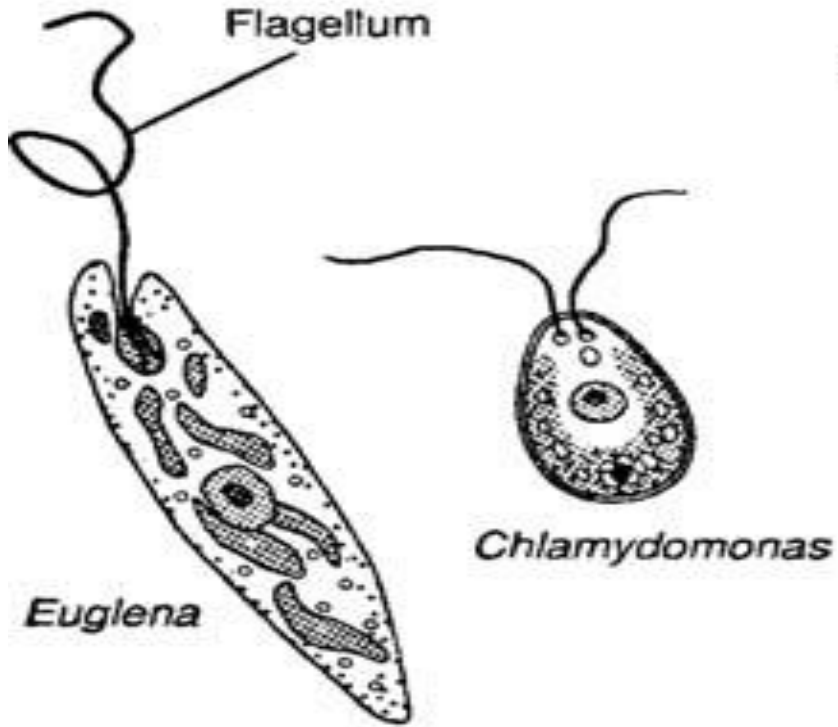
Ciliatea

Eg: Paramecium, Vorticella, Balatidium

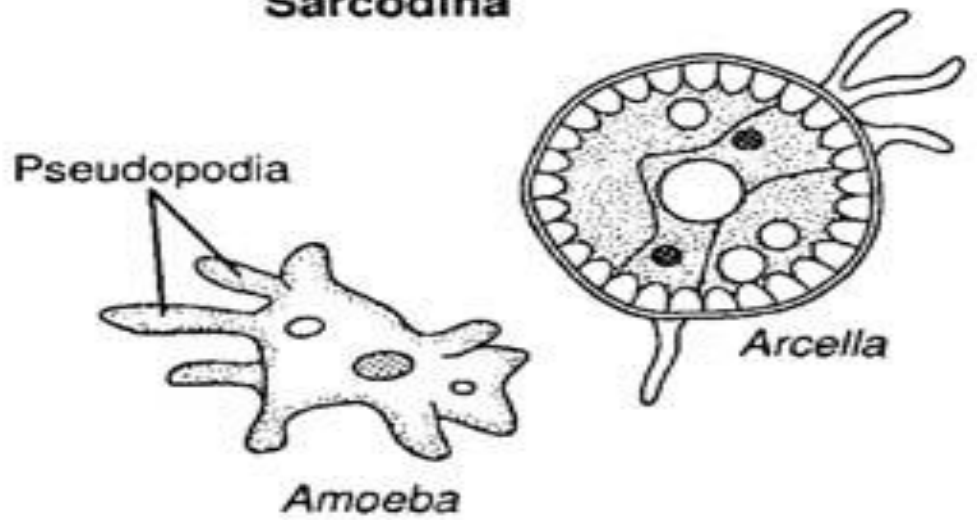
Table A.1: Classification of Protozoa



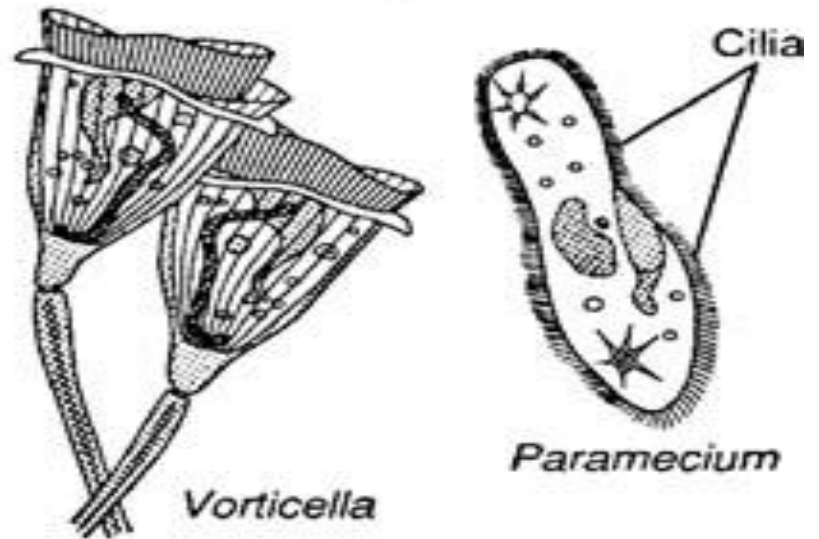
Mastigophora



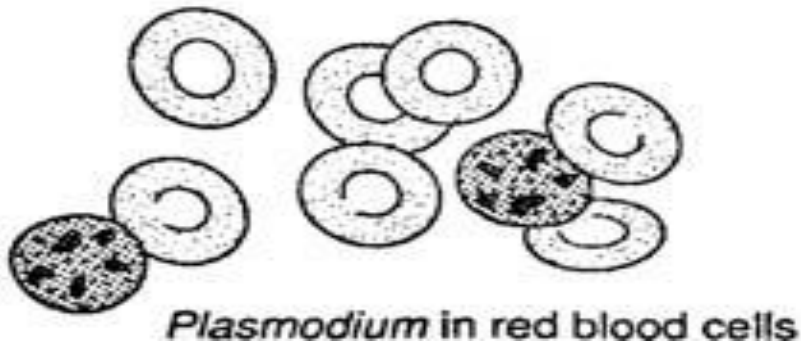
Sarcodina



Ciliophora



Apicomplexa



PROTOZOA

1



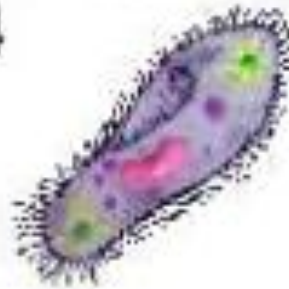
Rhizopoda

2



Cilliata

4



Flagellata

6



Sporozoa

8



Amoeba

3



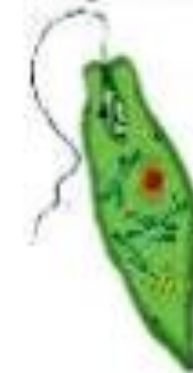
Paramecium

5



Euglena

7



Paramecium :

❖ Paramecium is found in freshwater ponds, pools, ditches, streams, lakes, reservoir and rivers etc.

❖ Paramecium is commonly known as Slipper animalcule because their shape is slipper like.

❖ Its anterior end is blunt and posterior end is pointed and its whole body is covered by a large number of microscopic hair like covering known as cilia.

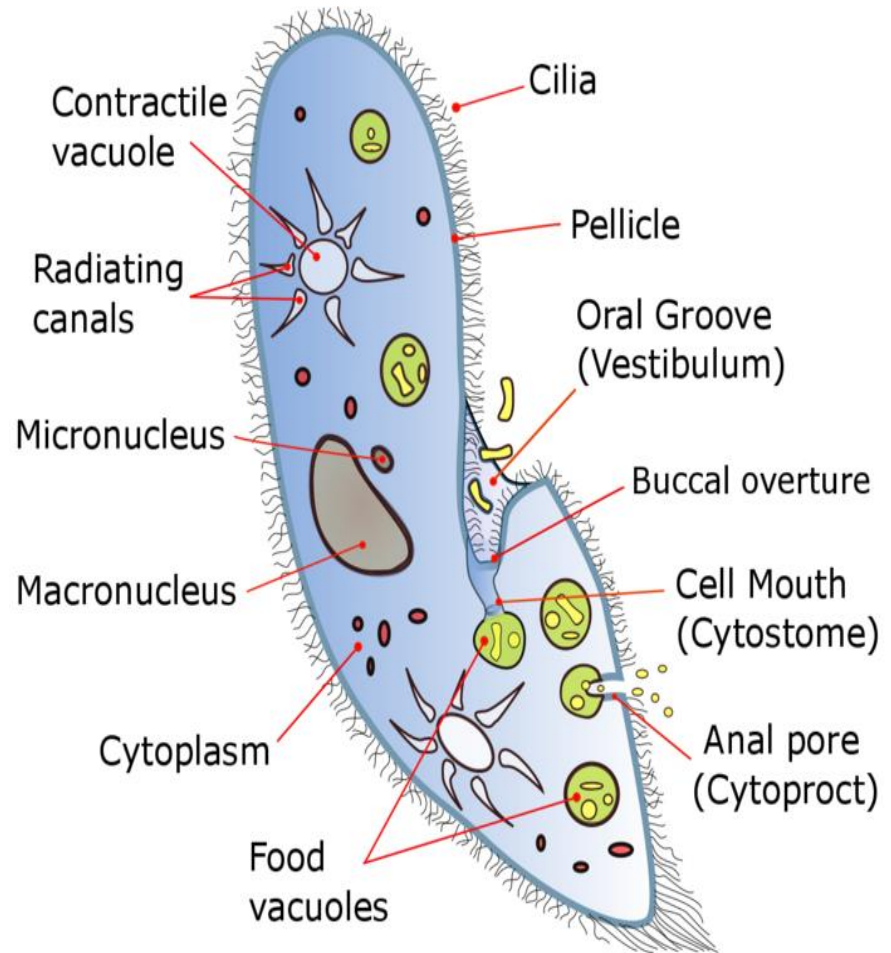
❖ Cytoplasm of the body is divided into ectoplasm and endoplasm, ectoplasm contains pellicle, basal granules and trichocysts, while endoplasm contains one large macronucleus and small micronucleus and two contractile vacuoles, reserve food vacuoles.

❖ On the oral side oral groove is present it makes mouth or cytostome and ended at cytopharynx.

❖ Locomotion by lashing of cilia and reproduction both asexual and sexual mode.

Classification –

Phylum	: Protozoa
Class	: Ciliata
Order	: Holotricha
Genus	: <i>Paramecium</i>
Species	: <i>cadatum</i>



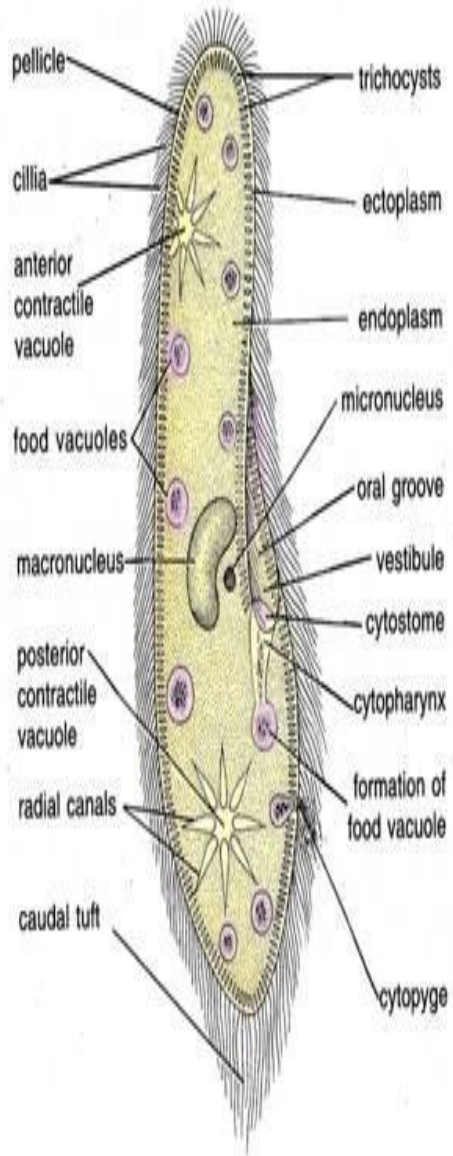
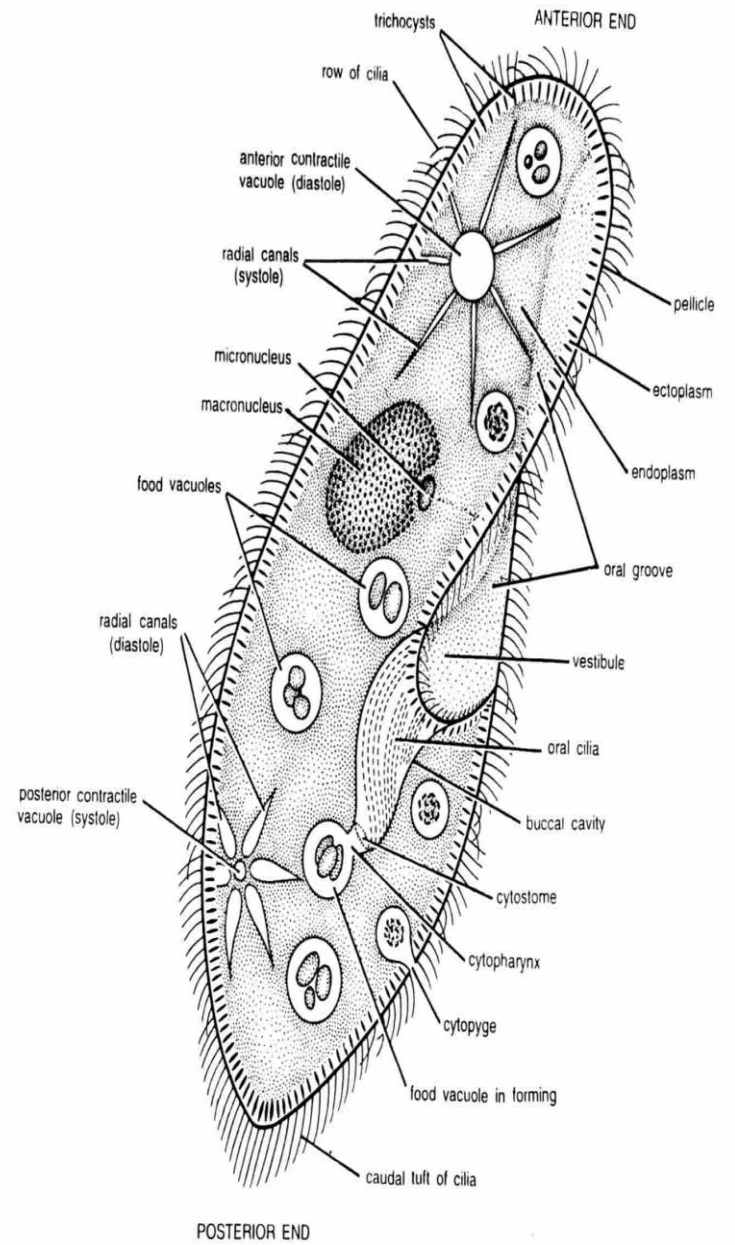


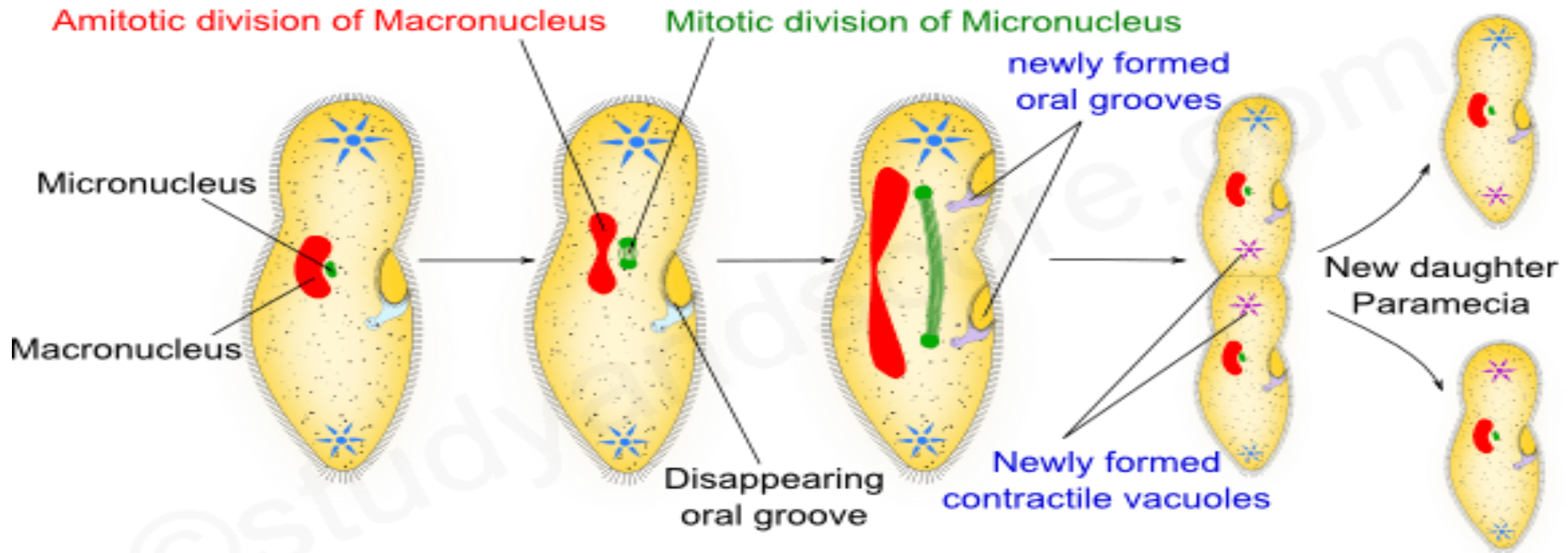
Fig. 20.1. *Paramecium caudatum*.



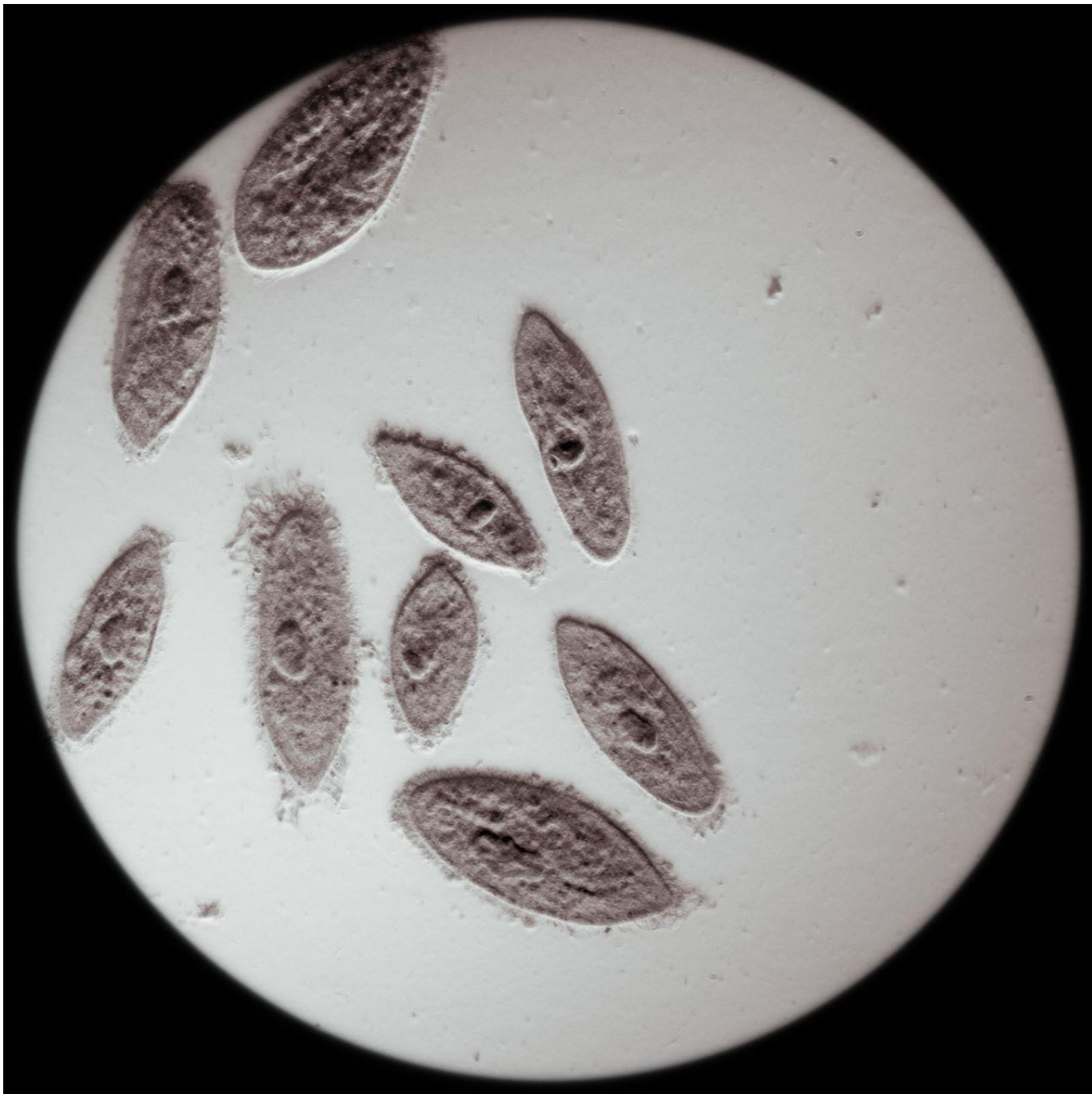
POSTERIOR END

Paramecium binary fission :

- ❖ Binary fission is the asexual mode of reproduction which takes place during favourable condition of food and temperature.
- ❖ During this process micro and macro nucleus elongates constrict and divide by mitosis and amitosis.
- ❖ Dividing line passes at right angle to longitudinal axis, a median transverse cytoplasmic constriction appears which deepens and divides the body transversally into two equal halves.
- ❖ By time of separation, each half develops all essential structures and receives a daughter micro and macronucleus and contractile vacuole.
- ❖ In binary fission two daughter individuals are formed.



STEPS IN TRANSVERSE BINARY FISSION IN PARAMECIUM



Paramecium conjugation :

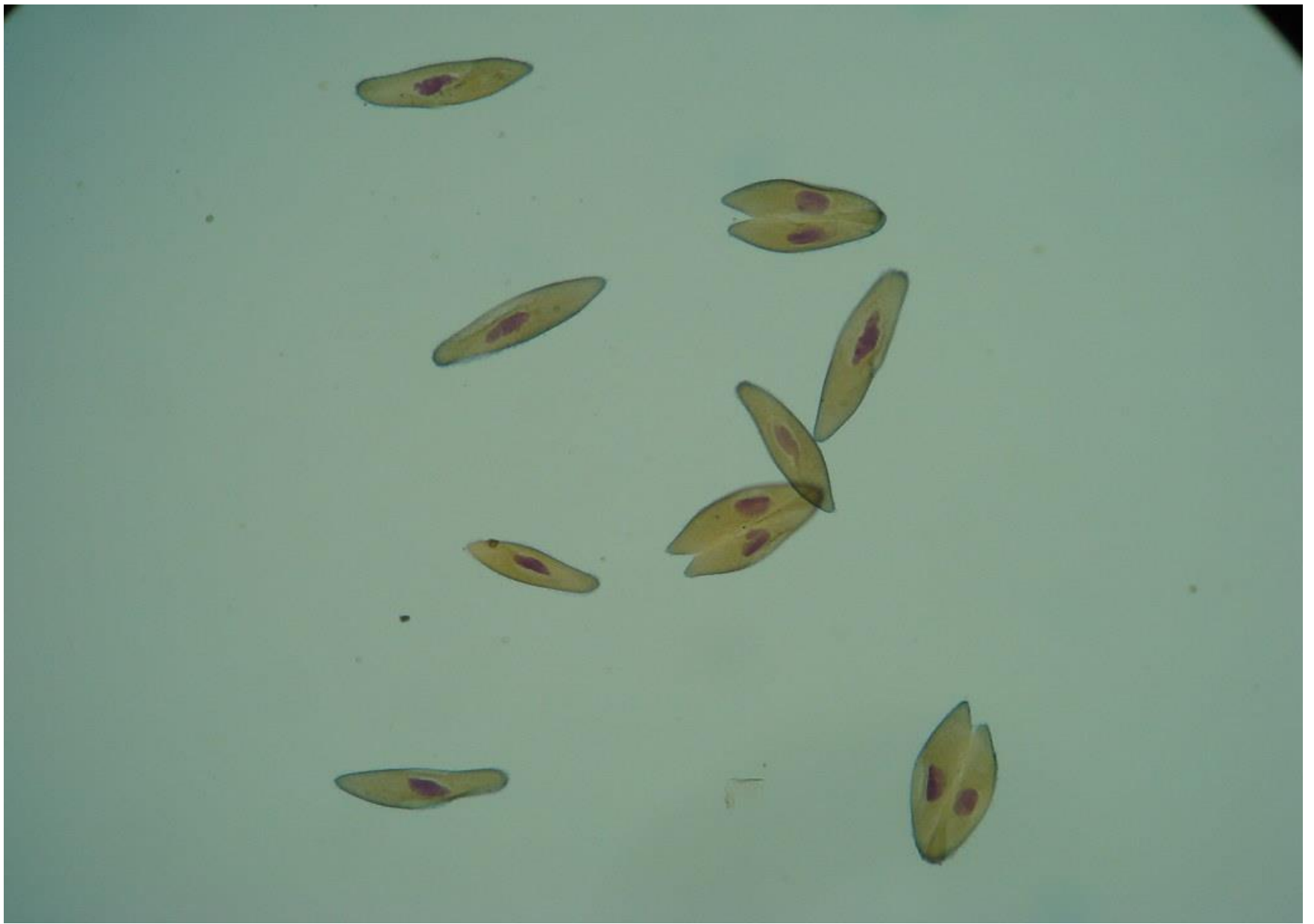
- ❖ Paramecium in conjugation constitutes the sexual part of the reproduction.
- ❖ In this process two paramecia come in contact vertically and unite at oral groove surface.
- ❖ The pellicle layer degenerate and a protoplasmic bridge is formed between the two paramecia , now both paramecia are called conjugants.
- ❖ Macronucleus disappeared in both conjugants and micronucleus divides twice giving rise to four haploid daughter micronuclei.
- ❖ Three daughter micronuclei out of four disintegrate in each conjugants, while remaining one divides into two unequal daughter pronucleus. The smaller is called male migratory pronucleus and larger female stationary pronucleus.
- ❖ Migratory pronucleus moved through protoplasmic bridge and fuses with stationary female pronucleus of other conjugants and form zygote or synkaryon.



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- ❖ After this nuclear division continues and a series of changes, four adult paramecia are formed.
- ❖ Conjugation is significant because it imparts rejuvenation, nuclear reorganisation and hereditary variations.



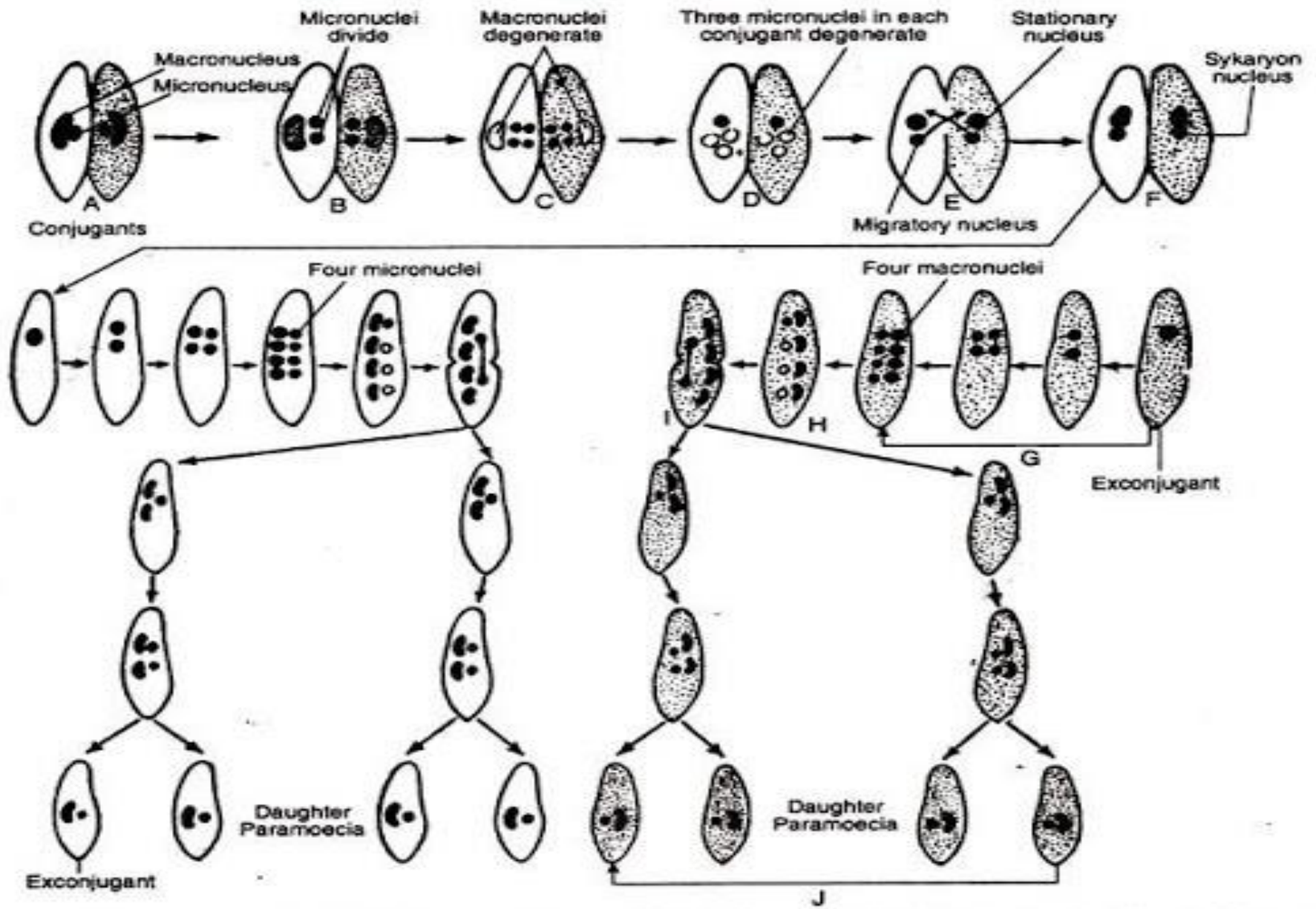


Fig. 10.42: Stages of conjugation in *Paramecium caudatum* (diagrammatic). Note that two individuals (shown in different shades) come together, exchange their nuclear material and then separate. Each individual ultimately produces four daughter paramoecia.

THANK YOU