

## Classification of Protozoa

- The basis of classification is the locomotory organelles.
- A/c to Homborg et al. (1964), Protozoa have been classified in to following Subphyla.

### Subphylum - 1 Sarcomastigophora

- Organelles of locomotion are pseudopodia or flagella or by both.
- Nucleus is single type (Monomorphic).
- Nutrition takes place by Autotrophic or Heterotrophic.
- Life cycle may include of alternation of generation.

### Super-class A. Mastigophora (Flagellata)

- Simple & primitive
- Organelles of locomotion in adults are flagella.
- Body covered with pellicle.
- They are mostly free-living though some are parasitic.

### Class - 1 Phytomastigophora

- Chlorophyll-bearing chroomatophores present.
- Nucleus is vesicular.

### Order - 1 Chrysomonadida

- Small flagellates with yellow or brown chroomatophores.
- It contains one or three flagella.
- Marine & fresh water.

Ex Chrysamoeba

### Order - 2 Coelithophorida

- It's tiny marine flagellates covered by calcareous platelets or coeliths.
- It contains two flagella.
- Yellow to brown chroomatophores.

Ex Coelithus

### Order - 3. Heterochlorida

- It contains two unequal flagella.
- Yellow-green chroomatophores.

Ex - Heterochloris

Order - 4 Cryptomonadida

- It is green, yellow, brown or colourless chromatophores which form starch.
- It contains two flagella.
- Marine or fresh water.

Ex Chilomonas

Order - 5 - Dinoflagellida

- Body covered with cellulose.
- Chromatophores are green, yellow or brown

Ex Noctiluca

Order - 6. Euglenida

- Body covered with thick pellicle.
- It contains one or two flagella.
- Reserve food material is paramylum and oil.
- Mostly fresh water.

Ex. Euglena, Levanema

Order - 7. Volvocida

- Mostly fresh water, some form colonies
- Body covered with cellulose.
- It contains two flagella.
- Reserve food is starch.

Ex - Volvox,

Class - 2 Zoomastigophore

- Most of them are parasitic
- It contains one or more flagella
- Reserve food is glycogen

Order - 1 choanoflagellida

- Feeding in fresh water or salt water
- Nutrition holozoic

Ex Proteospongia

Order - 2 Rhizomastigida

- It is mostly free-living.
- Locomotion takes place by flagella & pseudopodia

Ex Amoeba

Order - 3 - Kinetoplastida

- Parasitic form live in blood.
- Holozoic or Saprozoic nutrition.
- Kinetoplast - is present - as a self producing - organelles

Ex *Leishmania donovani* (Kala-azar), *Trypanosoma gambiense*.

Order - 4 - Diplomonadida

- It's mostly intestinal parasite.
- uniuelsate or multiuelsate (sometimes)
- Flagella 3 to 8 in numbers

Ex - *Alexamita*, *Giardia*

Order - 5 - Retostamonadina

- one or two flagella
- Gut parasites of insects or vertebrates
- It contains both one to four flagella,

Ex *Chilomonas*

Order - 6 - Bicosecida

- Largely freshwater flagellates.

Ex *Salpingoeca*

Order - 7 - Hypermastigida

- Gut parasites of termites, cockroaches & woodroaches.
- Mouth absent, food digested by pseudopodia
- Highly specialized forms with numerous flagella

Ex, *Lophomonas*, *Trypanomyxa*

Superclass - B - Opalinata

- All are parasitic
- Two or more mononucleic nuclei & present -

Ex *Opalina*

Superclass - C - Sarcodina

- locomotion takes place by pseudopodia
- formation of gametes and flagellated young ones are common

Class - 1. Rhizopoda

- Locomotion takes place by lobopodia or filopodia.
- It is generally creeping forms.

Subclass (1) Lobosia

- Pseudopodia are typically lobose rarely filiform.

Order (a) Amoebida

- It is typically unimucate
- Ecto & Endoplasm well demarcated.

Ex Amoeba proteus, Entamoeba histolytica

Order (b) Arcellinida

- They are free-living, mostly in freshwater
- Pseudopodia are extended through a definite aperture

Ex Arcella

Subclass - (2) Filisia

They have tapering & branching filopodia

Ex Coenocia

Subclass (3) ~~Rhizosia~~ Granuloreticulosa

- They have finely granular reticulate Rhizopodia.

Order (a) Foraminiferida

- Pseudopodia emerge from aperture or wall perforation or both.
- Gametes usually flagellate

Ex Elphidium

Subclass - (4) Mycetozoa

- Nutrition phagocytic
- Life cycle complex & contains sexual reproduction

Ex Plasmodium

Class - 2 Trophozoa

- Small, round, oval shaped, or Amoeboid parasite in vertebrate RBC

Ex Babesia

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CLASS 3: Actinophorea

- Locomotory organelles are delicate & radiose <sup>auxo-</sup>podia
- Gametes are usually flagellated.

Subclass - 1 Radiolaria

- All are marine.
- It contains spicules / or silicious skeleton  
Ex: Colloroxum.

Subclass - 2 Acantharia

- Marine, Auxopodia & contains anisotropic skeleton if Stratium Inpacti  
Ex: Acanthometra

Subclass - 3 - Heliozoa

- Rounded body & radiating Auxopodia
- These do not have capsule.  
Ex: Actinophrys.

Subclass - 4 - Pootomyxidia

- Largely marine & freshwater parasites of Algae & higher plants  
Ex: Valoniopsis

Subphylum II Sporozoa

- They are all parasitic
- Cilia or flagella may be present in gametes

Class 1 - Telosporae

- Pseudopodia are generally absent
- Reproduction is both sexual & asexual.

Subclass - 1 Gregarina

They are parasite in digestive tract & body cavity of invertebrates.

Ex: Gregarina.

Subclass - 2 Coccidia

- Being parasite in the digestive tract or blood.
- Gametocytes are asexual

## Order @ Eucoccidia

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- It's parasitic in endothelial & blood cells of invertebrates & vertebrates

- Schizogony takes place

### Suborder - 1 Eimeriina

- Zygote's non-motile.

Ex - Eimeria

### Suborder - 2 Haemosporina

- Zygote is often motile

- Haemoglobin of host cells forms pigment

Ex Plasmodium vivax (Malaria)

### Class - 2 Toxoplasmea

- Spores are absent

- Reproduction by Binary fission

Ex. Toxoplasma

### Class - 3 Haptosporae

- spores are present

- pseudopodia may be present but flagella are absent

Ex. Ichthyosporidium

### Subphylum - 4 Ciliophora

- All possess simple, ciliary, organelles for locomotion.

- Dimorphic nuclei

- Conjugation takes place

- Nutrition takes place by mixotrophic / heterotrophic

### Class - 1 Ciliata

- Locomotion takes place by cilia

- Most ciliates possess a cell-mouth or cytostome

### Subclass - 1 Holotricha

- Simple or uniform body cilia

### Order - 1 Gymnostomata

- Chiefly large ciliates

- Cytostome opens directly to outside

Ex. Dileptus, Tetrahymena

Order - 2 Trichostomatida

- With vestibular but no buccal ciliature.
- Ex Colpoda, Balantidium.

Order - 3 Apostomatida

- Marine parasite or commensals.
- Cytostome mid ventral part.
- Ex Tyallophyza

Order - 4 Astomatida

- Cytostome absent.
- Body ciliation uniform.
- Ex Anoplophyza.

Subclass - II Pezizozoa

Order Pezizozoa

- Mostly attached stalked ciliates
- Adults usually lack body cilia.
- Ex Vorticella

Subclass - III Suctorica

Order - 1 Suctorica

- Adult stage devoid of any ciliature.
- Ex - Ephelota

Subclass - IV Spirotrichia

Generally reduced body cilia.

Order I Heterotrichida

Body contains uniform cilia

- Ex Stentor, Bursaria.

Order - 2 Oligotrichida

- Small ciliates with body cilia reduced or absent.
- Ex. Halteria

Order - 3 Hypotrichida

Dorsoventrally flattened ciliates

- Ex - Euplates, Loxostyla etc.