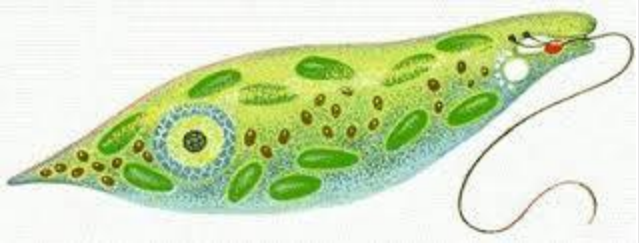
CHAPTER 2 - BIOLOGICAL CLASSIFICATION



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Biological classification

- The process of grouping living organisms into convenient categories based on simple characters is known as **Biological classification.**

Two kingdom classification.

- Plants. (autotrophs, cell wall, do not move)
- Animals (heterotrophus, no cell wall, can move)

Linnaeus - plantae & Animalia

Later found two kingdom classification was not sufficient because in that

- 1. Prokaryotes & Eukaryotes were grouped together.
- 2. Heterotrophs & Autotrophs were together.
- 3. No difference between unicellular and multicellular

Five kingdom classification. (R.H Whittaker 1959)

Main criteria for classification:

- Complexity of cell structure (prokaryotes/ eukaryote)
- Body organization (unicellular/ multicellular)
- Mode of nutrition (autotrophic / heterotrophic / holozoic)
- Life style (producers / consumers / decomposers)
- Phylogenic relationships (revolutionary history)

Five kingdoms are

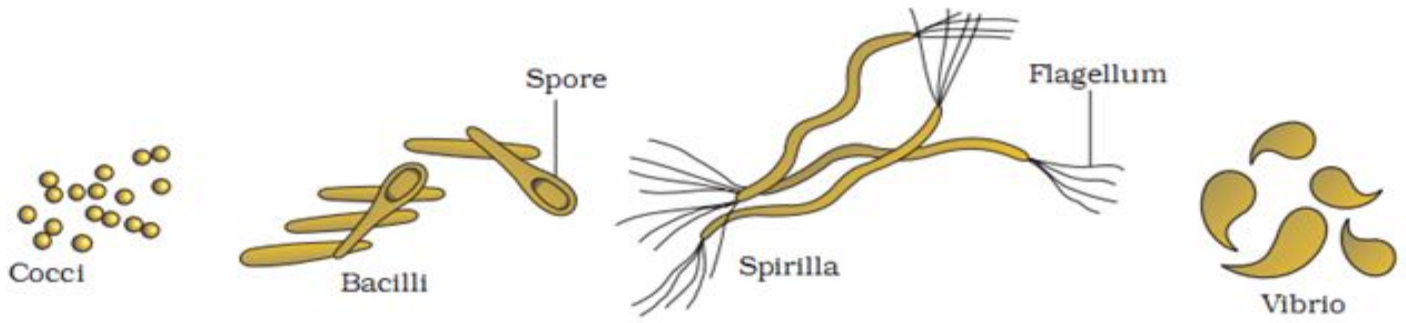
- 1. Kingdom Monera (bacteria) – prokaryotic unicellular

Kingdom - Monera (eg. Bacteria)

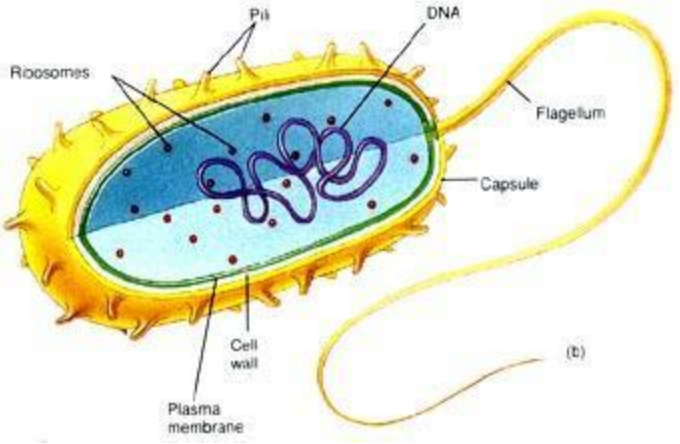
- Habitats- omnipresent
- Grouped in to 4 groups based on their shape.
- 1. Cocus (spherical) 2. Bacillus (rod) 3. Vibrio (comma) 4. Spirillum (spiral)
- Mode of nutrition – autotrophs and heterophs.

Kingdom Monera – includes;

- 1. Archaebacteria
- 2. Eubacteria (Cyanobacteria, Chemosynthetic and Heterotrophic)
- 3. Mycoplasma



Archaebacteria – Harsh habit
Halophiles (saline)
Thermoacidophiles (hot spri
Methanogens (gut of ruminar



Eubacteria – True bacteria - Rigid cell wall - Motile flagellum

Autotrophic bacteria - Cyanobacteria (BGA) have chlorophyll a unicellular, colonial/ filamentous.

- Marine /terrestrial habitat/ gelatinous sheath
- Form blooms - can fix nitrogen in heterocysts. Eg. Nostoc, Anabaena.

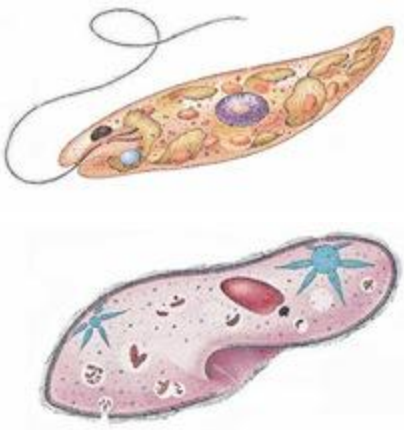
Chemosynthetic bacteria – Oxidise nitrates , nitrites and ammonia release energy (ATP) help in Recycling of nutrients (eg. Pseudomonas, nitrobacter)

Heterotrophic bacteria – Decomposers – making curd from milk, antibiotics, nitrogen fixing (Rhizobium) some are pathogenic (cause diseases) cholera, T.B, diarrhea.

- Reproduction by binary fission, spore / sexual reproduction.

Mycoplasma. No cell wall – smallest living cell.

Kingdom -Protista



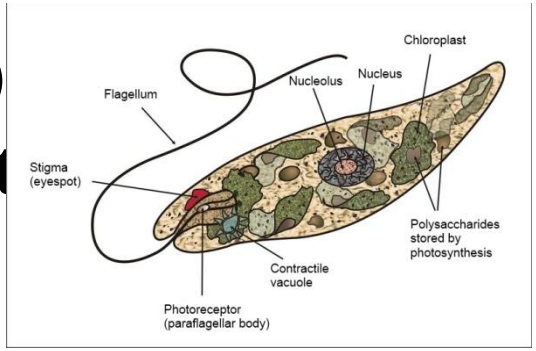
(a) Euglena (b) Paramoecium

- Unicellular – Eukaryotic – aquati
- Flagella / cilia - Reproduce sexual asexually

Chrysophyta :

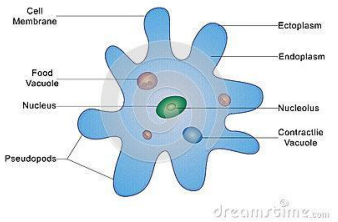
- Planktons diatoms and golden algae (desmids)
- Fresh water/ marine
- Microscopic – photosynthetic
- In diatoms , cell wall is indestructible (silica)form diatomaceous earth, its being gritty used for polishing, fitration of oil and syrups.
- Chief producers in oceans.

- Dinoflagellates. Marine photosynthetic, yellow, green, blue or red pigments - Cell wall is cellulosic – have 2 flagella - Red dionflagellate (Gonyaulax) forms red tides and toxins are released.
- Euglenoid eg. Euglena
- Fresh water – stagnant water – no cell wall but protein rich layer is present, called pellicle.
- Pellicle is flexible with flagella – they are Myxotrophic, because Photosynthetic (in light)
- Heterotrophs (when no light)
- Myxotrophs – Mixture of bot and heterotrophs

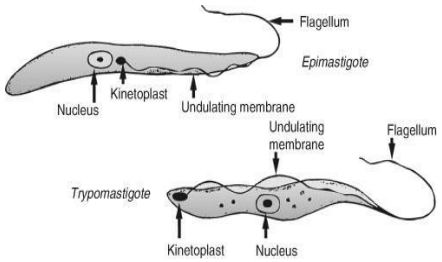


Protozoans – Heterotrophs – predators/ parasites

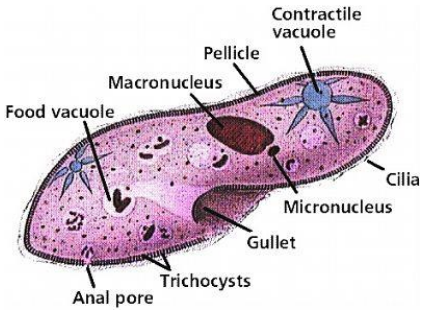
- There are 4 major groups;



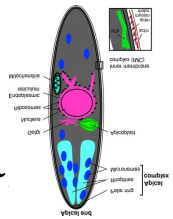
Amoeboid protozoans. Fresh water, sea and moist soil -pseudopodia – marine forms have silica shells . *Entamoeba (parasite) cause Amoebic dysentery*



Flagellated protozoans - free living / parasites have flagella – parasites cause diseases – Sleeping sickness (*Trypanoroma) is a parasite of flagellated protozoans.*



Ciliated protozoans – aquatic cilia cavity gullet eg. *Paramoecium.*



Kingdom - Fungi

- Multicellular – eukaryotic – heterotrophic - cosmopolitan - grow in warm and humid places.
- Fungi are filamentous with long, slender thread like Hyphae and the net work of hyphae is known as Mycelium – They can be septate or non septate (aseptate)
- Multinucleated cytoplasm (coenocytic hyphae)
- Cell wall is made up of chitin.
- Parasitic/ symbionts (Lichens and Mycorrhizae)
- Symbionts of algae and fungi

Agaricus

Reproduction by fragmentation, fission, buddin.

Asexual reproduction by oospores, ascospores, basidiospores.

Sexual reproduction steps.

- 1. Plasmogamy
- 2. Karyogamy and
- 3. Meiosis in zygote result in haploid spores – dikaryon

Dikaryophase

- Zygote (2n –diploid) □haploid Spores (n –

Based on morphology of mycelium mode of spore formation, fruiting bodies , there 4 classes;

1. Phycomycetes
2. Ascomycetes
3. Basidiomycetes
4. Deuteromycetes

1. **Phycomycetes :**

- Aquatic decaying wood mycelium is aseptate coenocytic
- asexual reproduction by zoospores (motile) / aplanospores (non motile)
- Eg. Rhizopus, mucor.

2. Ascomycetes : (Sac fungi)

- Multicellular (penicillium) / Unicellular (y
- Saprophytic – decomposers – parasitic – coprophilous
- Mycelium is branched and septate –asexual spores are called conidia
- Sexual spores are called ascospores.
- Eg. Aspergillus, Neurospora

3. Basidiomycetes : (Eg. Mushroom/ bracket fungi/ puffballs)

- Grow in soil, logs, tree stumps, in plant b
  parasitic (as rust and smuts)
- Mycelium is branched and septate
- Reproduction by fragmentation
- Dikaryon – basidium –karyogamy
- Eg. Agaricus (mushroom)

4. Deuteromycetes :

- Imperfect fungi mycelium is septate and branched.
- Only asexual reproduction by conidial spores
- Saprophytes / parasitic / decomposers
- Help in Mineral cycling
- Eg. Trichoderma, Alternaria

Kingdom - Plantae

- Autotrophs – size varies from herbs to tall trees. There are different groups;
- Algae
- Bryophytes
- Pteridophytes
- Gymnosperms
- Angiosperms

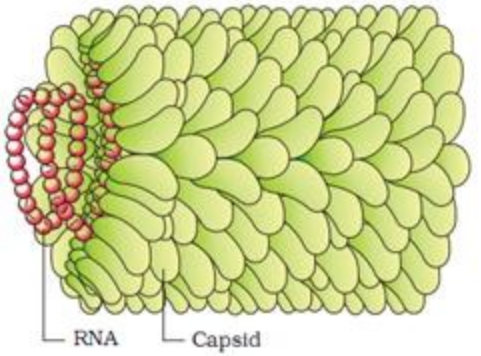
  Monocotyledons and Dicotyledons

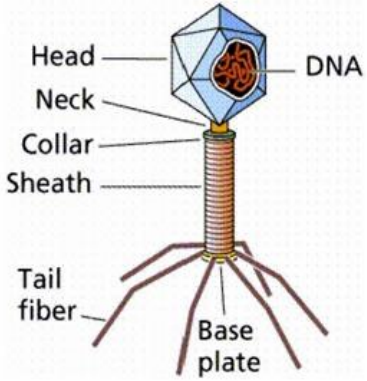
5.Kingdom Animalia :

- Heterotrophs – locomotory – holozoic / saprophytic / parasitic – cosmopolitans.
- It consists of two subkingdom Invertebrata with 9 Phylum and Phylum Vertebrata (Chordata) with 5 Classes.

Virus:

- Pasteur coined the term virus, which means Venom / poison. It is made of a outer protein coat and a centre genetic material (RNA / DNA). A virus is a nucleoprotein and the genetic material is infectious.
- Virus that infect plants have single stand RNA and those infect animals have either single or double RNA or double stranded DNA. Bacteriophages are viruses that infect the bacteria. Viruses cause disease like mumps, small pox, herpes, influenza and AIDS. In plants the symptoms can be





(a) Tobacco Mosaic Virus (TMV) (b) Bacteriophage

Viroids

- T.O. Diener discovered a new infectious agent that was smaller than viruses and caused potato spindle tuber disease. It has only a free RNA and lacked the protein coat, so named as viroid.

Lichens

- Symbiotic association between algae and fungi. Phycobiont is algal component, which prepare food for
- fungi and Mycobiont is a fungal component, which provide shelter and absorb mineral nutrients and water for its partner.


Thanking
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