

Kingdom Protista - protistos... first of all

- by Ernst Haeckel 1866

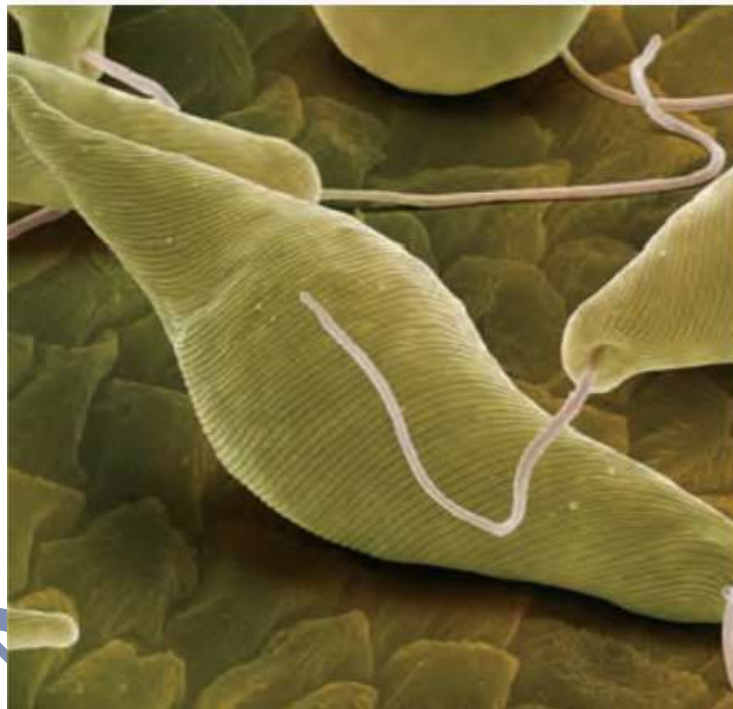
- All are single-celled eukaryotes
- First eukaryotes on earth
- Connecting link between prokaryotes and other eukaryotes
- It is believed that they gave rise to the fungi, higher plants, and multicellular animals.
- **Members of Protista are primarily aquatic.**
- The protists evolved about **1.6 billion years ago.**
- **Dust bin group :** Heterogenous assemblage of related forms
- Highest nutritional diversity
- Are extremely complex

Plant like (Algae like or Photosynthetic) Protists

Euglenoids (Euglenophyceae)

- Interlocking proteinaceous strips arranged in a helical pattern form a flexible structure called the Pellicle, which lies within the plasma membrane of the euglenoids.

- Some euglenoids with chloroplasts may become heterotrophic in the dark; the **chloroplasts become small and nonfunctional**. If they are put back in the light, they may become green within a few hours.
- The flexibility of the pellicle allows euglenids a characteristic flexibility (**euglenoid movement** when cells are on solid substrates.)
- In *Euglena* **two flagella** are attached at the base of a flask-shaped opening called the **reservoir**, which is located at the anterior end of the cell.
- **Contractile vacuoles**
- **chlorophylls a and b**
- Store **paramylon starch** as reserve food material.- **scattered in cytoplasm**
- **Mixotrophic nutrition**
- Locomotion – **flagellar** and **metaboly** (euglenoid)
- Binary fission - **longitudinal binary division** and **Cyst formation**



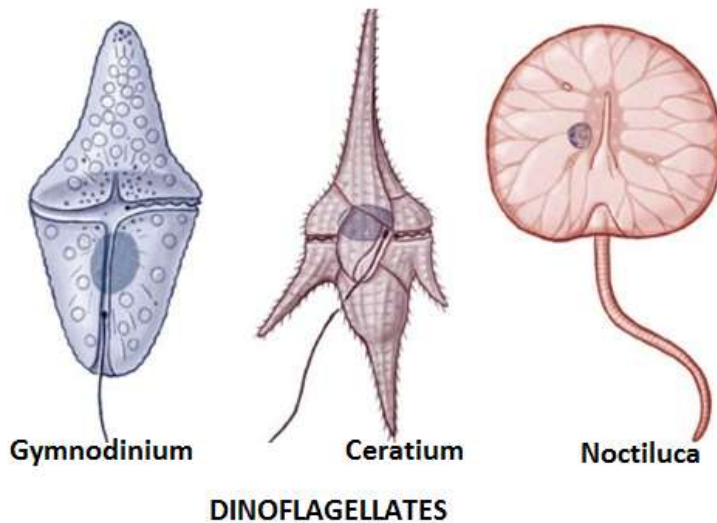
Dinoflagellates (Dinophyceae) – fire algae

- Appear **yellow, green, brown, blue or red**
- Outer coverings of stiff cellulose plates **theca** which give them very unusual appearances **armoured body**
- Have two flagella in a furrow between the wall plates -- flagella beat in two grooves, one encircling the cell like a belt and the other perpendicular to it.
- As they beat, the encircling flagellum causes the dinoflagellate to **spin like a top**
- **Whirling swimmer” “whirling whip.”**
- **Red dianoflagellates** (**Gonyaulax**) make the sea appear **red (red tides)**
- **Chlorophylls a and c**



Toxins released -

- Dinoflagellate release neurotoxins **Saxitoxins** - can concentrate in the bodies of **shellfish and fish**
- Although the shellfish are not harmed, they are poisonous to humans and other animals that eat them. - cause **Paralytic shellfish poisoning** **PSP**
- **Gymnodinium** **Gonyaulax**





Red tides

Diatoms (Chrysophyceae / Bacillariophyceae)

This group comprises the **Diatoms** (most numerous), the golden-brown algae (**Desmids**)

Diatoms

- Diatoms (**Yellow-green algae**) + **golden-brown algae** (desmids)
- **Diatoms are encased in a double shell**, each half of which fits together like the top and bottom of a soap box. The large half of the shell is termed the **epitheca**, the smaller the **hypotheca**.
- Cell walls contain hydrated silica instead of cellulose. - **Have a siliceous skeleton (frustule)**
- **Vegetative cells are diploid**
- Chief 'producers' in the oceans -50%
- **Chl a c**, yellow-brown carotenoid **fucoxanthin**
- Store their food as **fats, oils, laminarin**.

Diatomaceous earth / Kieselguhr

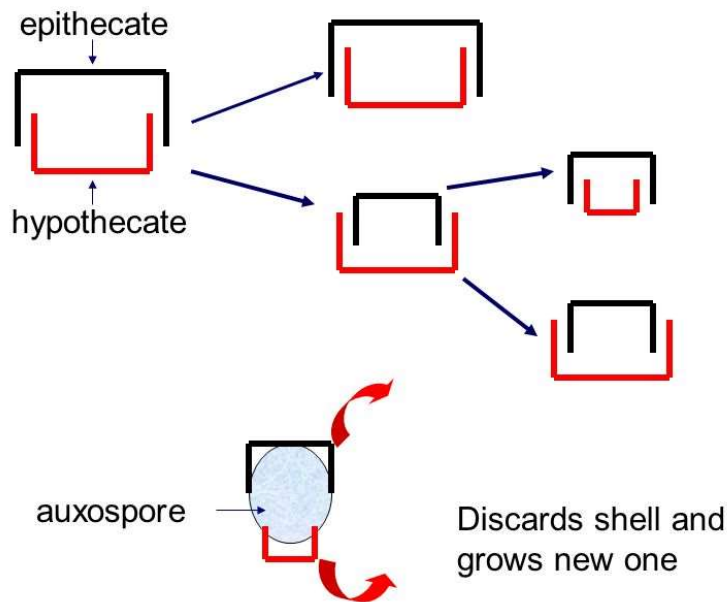
- gritty insulation industrial catalyst
- polishing, filtration of oils and syrups
- water filters
- sparkling quality to paint used on roads
- fingernail polish

Reproduction

- The common mode of multiplication is by binary fission.
- Each daughter retains one valve of the parent as **epitheca** and secretes a new **hypotheca**.
- As a result, one of the two daughter is slightly smaller than the parent.

- Repeated mitotic divisions leads to a reduction in cell volume as daughter cells synthesise new frustules that fit within the inherited parent frustule.
- Once a 30 per cent reduction in volume has been reached diatoms either produce a resting spore (or **auxospore**) to regain cell size or they reproduce sexually
- Over the generations there would be considerable reduction in size.
- The normal size is restored by the formation of **rejuvenescent cells (auxospores)**.

Diatom Reproduction- asexual



Fungi Like Protists / slime moulds

- Fungus animals
- **An animal like motile phase-** growth and feeding
- **A plant like, immotile-** reproductive phase
- Motile phase is commonly found under rotting logs and damp leaves, where cellulose is abundant.
- Body moves along decaying twigs and leaves **engulfing organic material**.
- **Plasmodium** which may grow and spread over **several feet**.
- Spores possess true walls.
- Extremely resistant and survive for many years
- Spores are dispersed by air currents.

There are two major groups

Plasmodial slime molds
Acellular slime molds

Ex : *Physarum*

Cellular Slime Molds
Pseudoplasmodial slime molds
Communal slime molds

Ex : *Dictyostelium*

Acellular slime molds

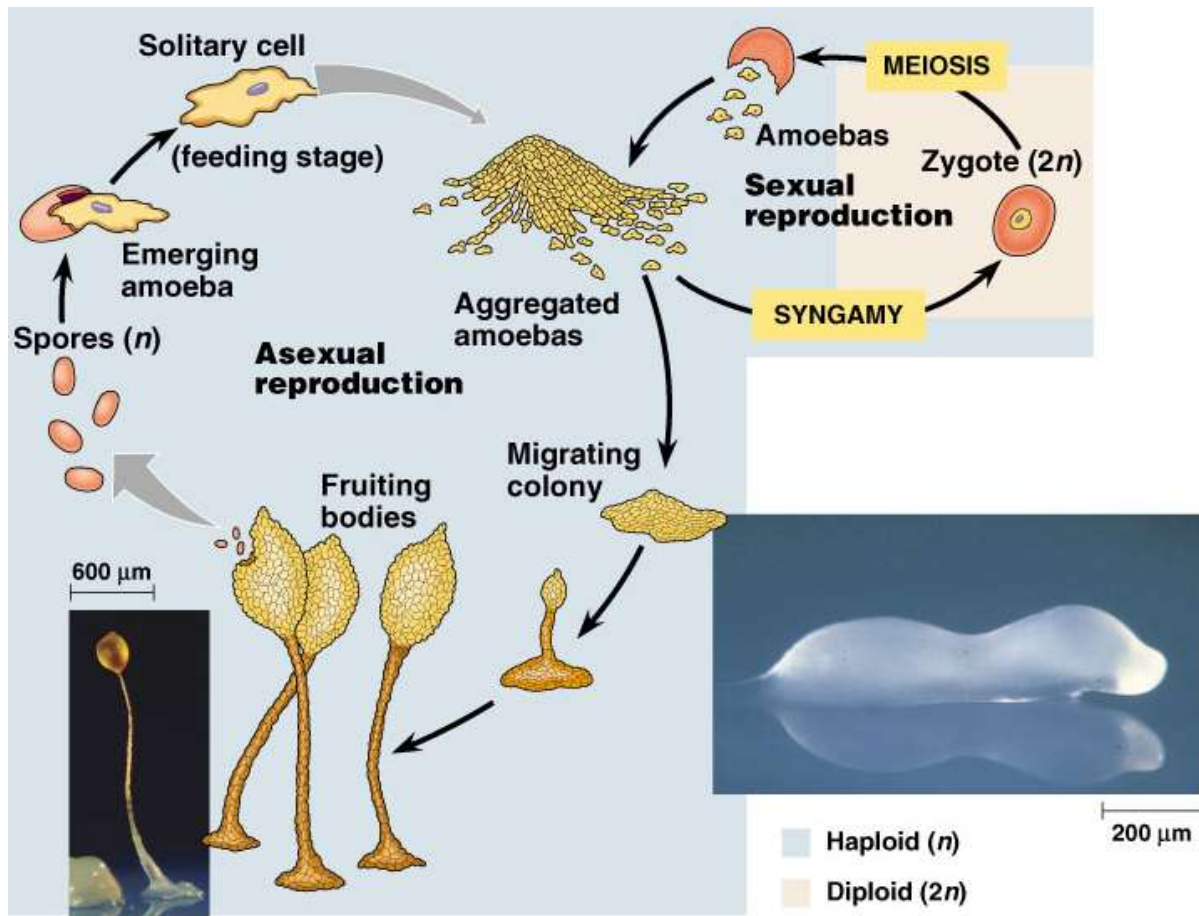
- Single cells with thousands of nuclei - **several inches and are often brightly colored**
- **One large bag of cytoplasm** with many diploid nuclei or coenocytic, mass, called a **plasmodium**
- Creeps about by amoeboid movement and Feed on by phagocytosis.
- Before entering the reproductive stage, a plasmodium moves to a **drier, better-lit place**, such as the top of a log. In the reproductive stage the **plasmodium is transformed** into one or more reproductive structures called **fruiting bodies**, each consisting of a stalk topped by a spore-producing capsule that resembles the reproductive structures of many fungi.





Cellular slime molds

- Spend most of their lives as **separate amoeboid cells**.
- In the absence of light / food the individual cells aggregate
- Individuals move toward one another - **moving mass** called a **Pseudoplasmodium**
- A chemical attractant, **acrasin**
- Up to 125,000 individual cells aggregate
- Resembles a slug and crawls about ingesting food
- **Slug resembles a blob of petroleum jelly**, leaving a trail of slime as it migrates.
- Slug eventually **stops moving and begins to rise vertically**, transforming into a **fruiting body**.



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