

Protista:

- A. Heterogeneous assemblage of unicellular, colonial and multicellular Eukaryotes that do not have the distinctive characters of plants, animals or fungi
- B. Contains a number of organisms previously classified as plants, animals or fungi. E.g. protozoans, all the algae except blue-greens, and several organisms previously called fungi
- C. Flagella - most often involved in locomotion
1. **Whiplash** - without appendages
 2. **Tinsel** - has appendages (barbs)
 3. Vary in number, size and/or position, e.g. **anterior** , **posterior** , **lateral** . Flagella may be present only in reproductive cells or not at all
- D. Sexual reproduction:
1. **Isogamy** - motile gametes the same size
 2. **Anisogamy** - motile gametes with the female larger than the male
 3. **Oogamy** - large non-motile female, smaller motile male

II. Classification

- A. Our text recognizes **12 divisions** . See tables in your text for a summary of their major characteristics
- B. Classification based on modes of nutrition, pigments (if present), carbohydrate food reserves, flagella, cell wall components and the environments they inhabit

III. Importance

- A. Important components of food chains. E.g. kelp beds are among the most productive ecosystems on earth
- B. Unicellular aquatic Protista (**plankton**) form a very important component of the food chain. The photosynthetic ones are called **phytoplankton** and the heterotrophic ones are called **zooplankton** (which also includes many animal larvae or tiny crustaceans)

Jun 24-11:16 AM

PHYLA OF PROTISTA

Euglenophyta - euglenoids - Named for Euglena

- A. Mostly freshwater
- B. About 900 species
- C. Virtually all are unicellular except for one colonial genus
- D. About 1/3 of the genera contain chloroplasts with chlorophylls A & B and carotenoids as found in true plants
- E. Reproduction via simple cell division. Sexual reproduction is lacking

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Myxomycota - Commonly called plasmodial slime molds.

- A. About 700 species
- B. Terrestrial
- C. Heterotrophic
- D. **Glycogen** carbohydrate food reserve
- E. Diploid
- F. **Lack cell walls** - exist as streaming masses of naked protoplasm which "creeps" over lawns, plants, rotting materials. They can cover an area of several meters
- I. **Plasmodium** - masses of naked protoplasm. As they travel they engulf bacteria, yeast cells, fungal spores and decayed plant and animal matter. The plasmodium contains many nuclei which undergo synchronous divisions
- G. Sexual reproduction involves the fusion of amoebae and/or flagellated gametes which come from spores produced within sporangia.

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Rhodophyta - commonly called red algae

- A. About 4,000 - 6,000 species
- B. Mostly marine but a few freshwater species, particularly abundant in **tropical** and warm regions.
- C. Usually grow attached to rocks or other algae, but there are a few free floating forms and a few unicellular or colonial forms
- D. **No flagellated cells at all in life cycle**
- E. They lack centrioles and structures called **polar rings** play the role of centrioles
- F. Autotrophic - contain **only chlorophyll A**, plus carotenoids, phycobilins
- I. Their chloroplasts seem to have originated as symbiotic cyanobacteria, which they resemble both biochemically and structurally

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Oomycota - Commonly called water molds. Also includes downy mildews, potato blight and many important agricultural pests on a variety of crops

- A. About 700 species
- B. Unicellular to highly branched, **coenocytic**, filamentous forms
- C. Heterotrophic
- D. **Cellulose** cell walls
- E. **Glycogen** carbohydrate food reserve
- F. Both sexual and asexual reproduction
- G. Asexual reproduction is via zoospores

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Bacillariophyta - diatoms

- A. About 100,000 extant species and many thousands of extinct species
- B. Major component of aquatic ecosystems. May account for 25% of the total primary production on earth
- C. Mostly **unicellular** but a few colonials
- D. **Diploid**
- E. Most autotrophic, a few are heterotrophic
- I. Autotrophs contain chlorophylls A & C and fucoxanthin, a golden-brown carotenoid. Some have lost their shells and they live symbiotically inside marine protozoa
- F. **Chrysolaminarin** (a glucose-mannitol polymer) carbohydrate food reserve (similar to the laminarin found in the brown algae)
- G. Lack flagella
- H. Cell walls, called **frustules**, are polymerized, opaline silica (glass like)
- I. Diatoms are abundant in the fossil record from at least 250 million years ago. Their silica shells have accumulated in large numbers to form large deposits of **diatomaceous earth**. Diatomaceous earth is used as filtering agents, insulating materials, abrasives (toothpaste, silver polish). One cubic cm contains 4.6 million diatom shells

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Phaeophyta - commonly called brown algae and/or kelps

- A. About 1,500 species
- B. Includes most of the conspicuous seaweeds of **temperate** regions, particularly along shorelines and intertidal zones
- 1. Kelp beds are some of the most productive ecosystems on earth. They flourish to depths of 100 ft., and may extend out about 6 miles from the coast line. The free floating forms may form dense masses, e.g. Sargassum forms the Sargasso Sea in the Atlantic northeast of the Caribbean Islands. Sizes range from microscopic to giant kelps up to 200 ft. long.
- C. Almost entirely marine, primarily of **colder** oceans
- D. Some of the kelps have tissue differentiation into holdfast, stipe and blade. Some also have air bladders for flotation
- F. Only reproductive cells have flagella

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Chlorophyta - commonly called green algae

- A. About 17,000 species
- B. **This is the group which gave rise to the true plants**
- C. Very diverse division with a wide variety of life forms and life histories
- D. Most are multicellular, but there are a few unicellular forms. **Many growth forms:**
 - 1. Unicellular motile - Chlamydomonas is typical flagellated, unicellular type. It has one large chloroplast and reproduces asexually via successive mitoses or sexually by fusion of two cells. Chlamydomonas life cycle
 - 2. Unicellular non-motile - look much like Chlamydomonas but lack flagella
 - 3. Non-motile colonial - free floating colonies, e.g. the water net, Hydrodictyon
 - 4. Motile colonial - two to thousands of Chlamydomonas - like cells held together in a gelatinous matrix. E.g. Volvox is a spectacular spherical colonial form made up of up to 60,000 Chlamydomonas like cells. The flagella of each cell beat in synchrony to move the colony about. There appears to be some division of labor and therefore beginnings of multicellularity & differentiation
- E. Mostly freshwater but some marine and terrestrial species found on soil, tree trunks, surface of snow, and as symbionts with fungi in Lichens

Jun 24-11:26 AM

Protozoan's

Protozoans - "Animal-like" protists. Heterotrophic. Most display a great deal of ability to move around.

Protozoans Possess many "Animal-like" characteristics. Often classified by how they move.

Amoeba - moves with Pseudopods (false feet)

Paramecium - moves with cilia

Flagellates - move like the Euglena flagellum

Sporozoans - produce spores

Amoeba - moves with Pseudopods

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Online Lesson on Protists

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