20.1 The Kingdom Protista

A. What is a protist?
- Any organism that is not a plant, an animal, a fungus or a prokaryote
- All are Eurkaryotic
- Most are unicellular however some can be multicellular
- Most live in water

B. Protists are classified by how they:

1. Obtain Nutrition
   a. animal-like protists – heterotrophs
   b. plant-like protists – photosynthetic autotrophs
   c. fungi-like protists – external digestion; decomposers or parasites

2. Move

20.2 Animal-like Protists: Protozoans
- protozoa – “first animals”
- heterotrophic
- distinguished by movement
  - 4 kinds – Zooflagellates, Sarcodines, Ciliates, Sporozoans

A. Zooflagellates
1. Euglena - moves by using 1 or 2 flagella
2. absorbs food through the cell membrane
3. genus Trypanosoma
   a. causes African sleeping sickness
   b. from the bite of a tsetse fly
   c. destroys blood cells and infects other tissues in the body
   d. affects nerve cells-person loses consciousness and can lapse into fatal sleep

B. Sarcodines
1. use pseudopods, “false feet,” for feeding and movement
   - Pseudopods surround and engulf food particles
2. Amoeba
   a. unicellular, continuously changes shape
   b. amoeboid movement – psuedopods extend out of cell. Cytoplasm streams into psuedopod and cell follows
   c. Species Entamoeba
      1) Common Disease - Amebic Dysentery
         - common in tropical areas with poor sanitation
         - ingesting contaminated water or food infects a person

C. Ciliates
1. genus Paramecium
   - beating of cilia moves the organism and propels food and water into its mouth pore or oral groove then into gullet and forms a food vacuole
   a. Anal pore – removes waste
   b. 2 types of nuclei
      1) macronucleus – keeps “working copies” of genes
      2) micronucleus – keeps “reserve copy” of genes
   c. Trychocysts – barbed structures discharged for defense or capturing prey
D. Sporozoans
   1. nonmotile but spreads through spores
   2. parasitic – obtains nutrients from the bodies of their hosts
   3. *Plasmodium*
      a. causes malaria in humans, mostly in tropical areas
      b. transmitted by the bite of the female *Anopheles* mosquito
      c. Cycle of Malarial Infection
         1) Bite of mosquito, sporozoites invade blood stream, moves to liver then to red blood cells
         2) Multiplies rapidly
         3) Red blood cells burst resulting in severe chills, fever.

20.3 Plantlike Protists: Unicellular Algae
- Photosynthetic = reason they are called plantlike.

A. Chlorophyll and Accessory Pigments
   1. Allows algae to harvest and use energy from sunlight.
         - These wavelengths of light are near the surface of water.
      b. Chlorophyll b or c absorb blue light which reaches deeper in water
   2. Accessory pigments help absorb light and give algae a variety of colors.

B. Euglenophytes (Euglena)
   1. moves using two flagella
   2. eye spot – used for sensing light and dark
   3. contains green chloroplasts; carries out photosynthesis when light is available
   4. in the absence of light, they are heterotrophs

C. Chrysophytes “golden plants”
   1. yellow-green algae and golden brown algae
   2. diverse group, golden yellow colored chloroplasts
   3. stores food in form of oils rather than starch

D. Diatoms
   1. thin, delicate cell walls rich in silicon, the main component in glass
   2. when they die, their shells sink to the ocean floor.
      - It forms diatomaceous earth used in metal polishes, toothpaste, and filters.

E. Dinoflagellates “fire plants”
   1. 2 flagella that wrap around
   2. many are luminescent – when agitated, they give off light
   3. Red Tide - Blooms or overpopulation of the red dinoflagellates
      - toxic to shellfish and fish.
      - Animals from areas of red tide should not be eaten.

F. Ecology of Unicellular Algae - base of aquatic food chain
   1. Phytoplankton
      - small photosynthetic organisms found near the surface of the ocean
      - carries out nearly half the earth’s photosynthesis
20.4 Plantlike Protists: Red, Brown and Green Algae
- Multicellular
- Classified by their photosynthetic pigments

A. Red Algae - phylum Rhodophyta
1. Contains chlorophyll a and phycobilins – a reddish accessory pigment good at absorbing blue light

B. Brown Algae - phylum Phaeophyta
1. contains chlorophyll a & c with brown accessory pigment, fucoxanthin which gives it a dark, yellow-brown color
2. largest and most complex, found mostly in shallow coastal waters
3. Giant Kelp – more than 60 m long

C. Green Algae
1. contains chlorophyll a & b
2. grows in ponds, ditches
3. has unicellular, colonial and multicellular forms
   a. Volvox – colonial, cells arranged to form hollow sphere
   b. Ulva, sea lettuce – multicellular
Fungi-like Protists
- similar to fungi in appearance and nutrition
- Heterotrophic, most are decomposers
- absorbs nutrients from dead and decaying matter
- lacks chitin in their cell walls

A. Slime Molds
- lives in damp environment rich in organic matter
- plays key role in recycling organic material
  1. Acellular Slime Molds
     a. Begins as individual cells; cells merge and form amoeboid structure with many nuclei
     b. Called a plasmodium
        - feeds by engulfing bits of organic matter as it creeps on forest floor
  2. Cellular Slime Molds
     a. individual cells that remain separate
     b. forms pseudoplasmodium when food is scarce
        1. cells join to form a colony
        2. consists of many membrane-bound cells

B. Water Molds
  1. produces hyphae - finely branched, single celled filaments
  2. downy mildews are parasites that live on plants
  3. Examples:
     o Ich – in fish tanks, white fuzzy growth on fish gills and bodies
     o Phytophthora – causes potato blight, most famous in Ireland resulting in famine and death