Kingdom Protista - PROTISTS

Kingdom Protista: is the most diverse of kingdoms and its members the most difficult to classify.
- contains 11 Phyla ( divisions )

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<th>Animal-like protists</th>
<th>Plant-like protists</th>
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<td>6 phyla</td>
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PROTISTA

Fungus-like protists
1 phyla

Protists have also been grouped according to other criteria:
(1) heterotrophs with no permanent locomotor apparatus (Amoeba);
(2) photosynthetic protists (Euglena) and algae;
(3) heterotrophs with flagella (Paramecium);
(4) non-motile spore formers (Plasmodium);
(5) heterotrophs with restricted mobility (water moulds, rust, mildew).

Characteristics of ALL protists:

- eukaryotes: cell has a true nucleus and membrane-bound organelles like mitochondria and vacuoles
- unicellular: sometimes look multicellular by forming colonies but each cell is independent (some are multicellular but cells do not form tissues)
- reproduction: ASEXUAL- binary fission, fragmentation
SEXUAL (some) - exchange DNA - conjugation
- habitat: live everywhere near MOISTURE
- fresh water, marine (salt) water, body fluids of animals

Other characteristics:

A. Plant-like protists:
- all contain CHLOROPHYLL found in chloroplasts (for PS)
ex. Euglena, see book pg 128

features:
- FLAGELLA: locomotion
- eyespot: to detect light, not for vision
- pellicle: flexible outer covering (no cell wall)
- starch: stored as granules similar to plants
- reproduction: asexual, called longitudinal fission, where cell divides lengthwise after nuclear division
ALGAE: an important plant-like protist group

The algae family is divided according to the type of CHLOROPHYLL they contain:

- brown
- red
- green

1. Seaweed: made up of brown and red algae
   - multicellular, but cells do not form TISSUES (cells are independent)
   - different than plants
   Seaweed (brown and red algae) provides most of the OXYGEN for oceans

2. Green algae:
   - unicellular
   - called PHYTOPLANKTON
   - main food for life in oceans
   See fig. 11, pg. 133

Reproduction in Algae

- binary fission
- fragmentation (asexual): the organism simply breaks apart
- conjugation (sexual): done by Spirogyra
  - exchange of DNA to form zygospores
  - see book pg. 129, fig. 4

Importance of Algae

- primary producers (autotrophs) in aquatic food chains (pg. 133, fig. 11)
  - they are the major food source for marine herbivores
  - they also supply 80% of the oxygen for the Earth

Human use:
- food - seaweed (sushi)
- fertilizers
- oil - brown algae stores food as oils (most oil from ocean came from ancient brown algae)
- agar - made from red algae, used to make drug capsules or growing medium for bacteria
- carrageenan - used in cosmetics, paints, ice cream

Problems with Algae: called algal bloom (ex. Minnow Lake)
- algae grows out of control and overtakes lake, river
- removes most of the oxygen from the water as it dies and decays
- this destroys all other life in the water

Major cause of algal bloom: runoff from land may be loaded with fertilizers
  - laundry detergents or shampoos, full of phosphates
B. Animal-like Protists:

- called PROTOZOANS
- heterotrophs, must eat to obtain energy
- classified according to their type of LOCOMOTION

- **Amoeba**: have pseudopods (fake feet)
- **Ciliates**: have cilia (tiny hairs) e.g. *Paramecium*
- **Flagellates**: have flagella (whip-like tails) e.g. *Euglena*
- **Sporozoans**: PARASITES (bad)
  - no method of locomotion, rely on body fluids of host for motion

1. **Amoeba**: cell contains 2 (two) layers of cytoplasm
  - a) ectoplasm - outer protective layer
  - b) endoplasm - inner layer

   Movement: The *amoeba* uses pseudopods for movement. The cell is always changing shape due to the continuous movement of the endoplasm. An amoeba moves by repeatedly extending and retracting its pseudopods.

   Feeding: ingestion by PHAGOCYTOSIS

   Reproduction: by binary fission

2. **Sporozoans**: pathogenic protozoans (bad protists)

   ex. *Plasmodium*: pathogen causes MALARIA
   - carried by mosquito genus *Anopheles*
   - the mosquito is a VECTOR: passes diseases to humans
   - see fig. 8, pg. 131

   Carriers: people who have the pathogen but do not show any symptoms (do not feel sick)
   - Problem: carriers can pass on the disease (pathogens) to others

   Pathogenic protists are problematic because they are difficult to remove.
   - form cysts or spores

   - **cysts**: a resting cell that forms under adverse conditions
   - has a hard, protective covering formed over the cell membrane
   - When conditions improve, the pathogen in the cyst can emerge to reinfect the host.

   - **spores**: reproductive cells made by *Sporozoans*
   - can develop into new pathogens without fertilization (asexual)
   - are HAPLOID: have (1) ONE set of chromosomes (DIPLOID = 2 sets)

3. Fungi-like Protists: also called slime moulds
Benefits of Protists:

- 80% of global oxygen provided by algae
- Phytoplankton: main producers in oceans, major food source for whales
  - zooplankton - tiny animals in oceans
  - decrease in these two populations can severely affect whales and other larger marine animals
- *Trichomonas hominis*: live in our intestines and feed on fibre from food but cause us no harm
- Termites: contain a protist that helps them digest the cellulose in wood
  - without this protist, the termite will die

Problems with Protists:

- Pathogens: cause many diseases
  - ex. Malaria, *Plasmodium*
  - Amoebic dysentery, *Entamoeba histolytica*
  - Beaver fever, *Giardia lamblia*
  - African sleeping sickness, *Trypanosoma*

WEBSITES

http://tolweb.org/tree?group=The_other_protists&contgroup=Eukaryotes

http://www.mhhe.com/biosci/genbio/raven6b/graphics/raven06b/other/raven06_35.pdf