

## Kingdom Protista - PROTISTS

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

Animal-like  
protists  
4 phyla

Plant-like  
protists  
6 phyla

### 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 ) ex. *Paramecium*
- *Flagellates*: have flagella ( whip-like tails ) ex. *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://tolweb.org/tree?group=The_other_protists&contgroup=Eukaryotes)

[http://www.mhhe.com/biosci/genbio/raven6b/graphics/raven06b/other/raven06\\_35.pdf](http://www.mhhe.com/biosci/genbio/raven6b/graphics/raven06b/other/raven06_35.pdf)