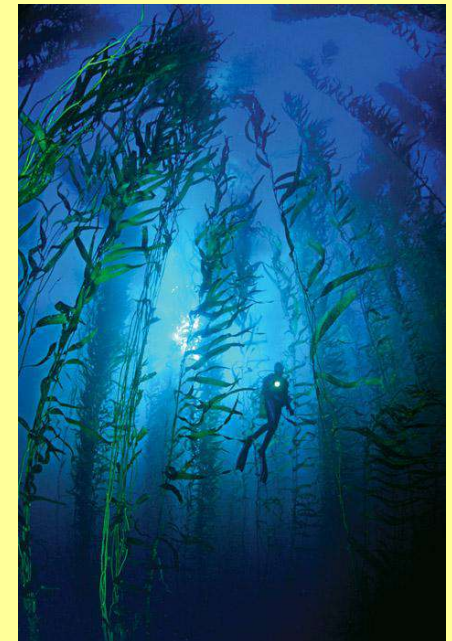


Biology Chapter 19

Kingdom Protista

Domain Eukarya



Description

Kingdom Protista is the most diverse of all the kingdoms.

Protists are eukaryotes that are not animals, plants, or fungi.

Some unicellular, some multicellular.

Some autotrophs, some heterotrophs.

Some with cell walls, some without.



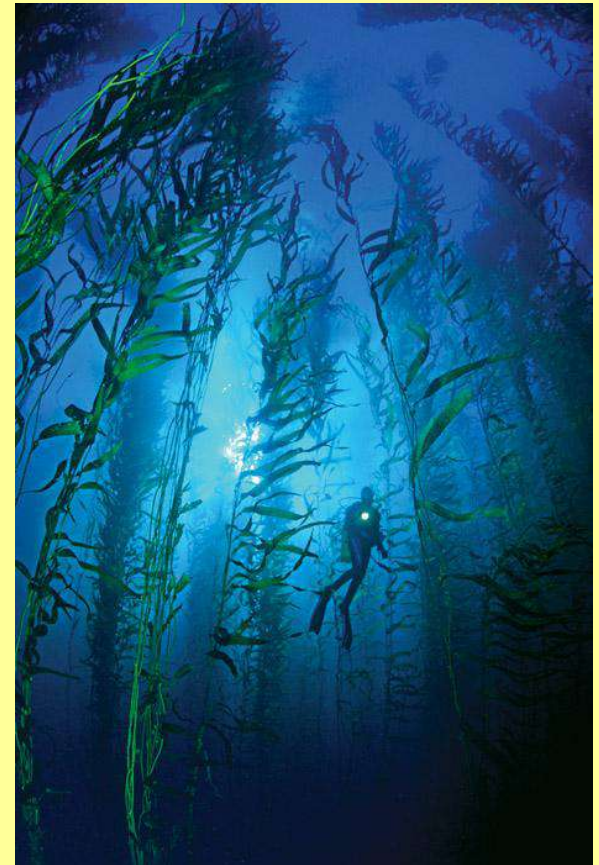
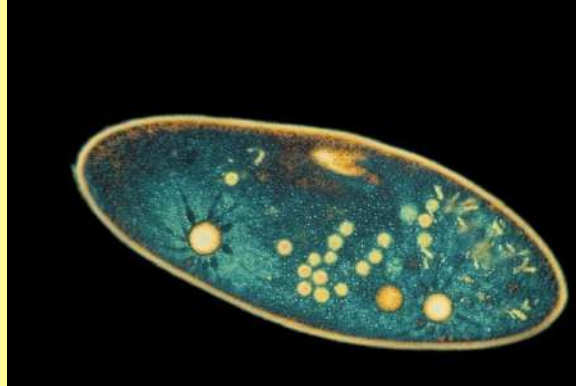
Didinium protist devouring a *Paramecium* protist that is longer than it is! Read about it on p. 573!

Where Do They Live?

- Because of their diversity, we find protists in almost every habitat where there is water or at least moisture!

▶ Common Examples

- Ameba
- Algae
- Paramecia
- Water molds
- Slime molds
- Kelp (Sea weed)



 **Classified By: (DON'T WRITE THIS DOWN YET!!!)**

- Mode of nutrition
- Cell walls present or not
- Unicellular or multicellular

▶ **Protists can be placed in 3 groups: animal-like, plantlike, or funguslike.**

Didinium, is a specialist, only feeding on *Paramecia*. They roll into a ball and form cysts when there is are no *Paramecia* to eat. *Paramecia*, on the other hand are generalists in their feeding habits.

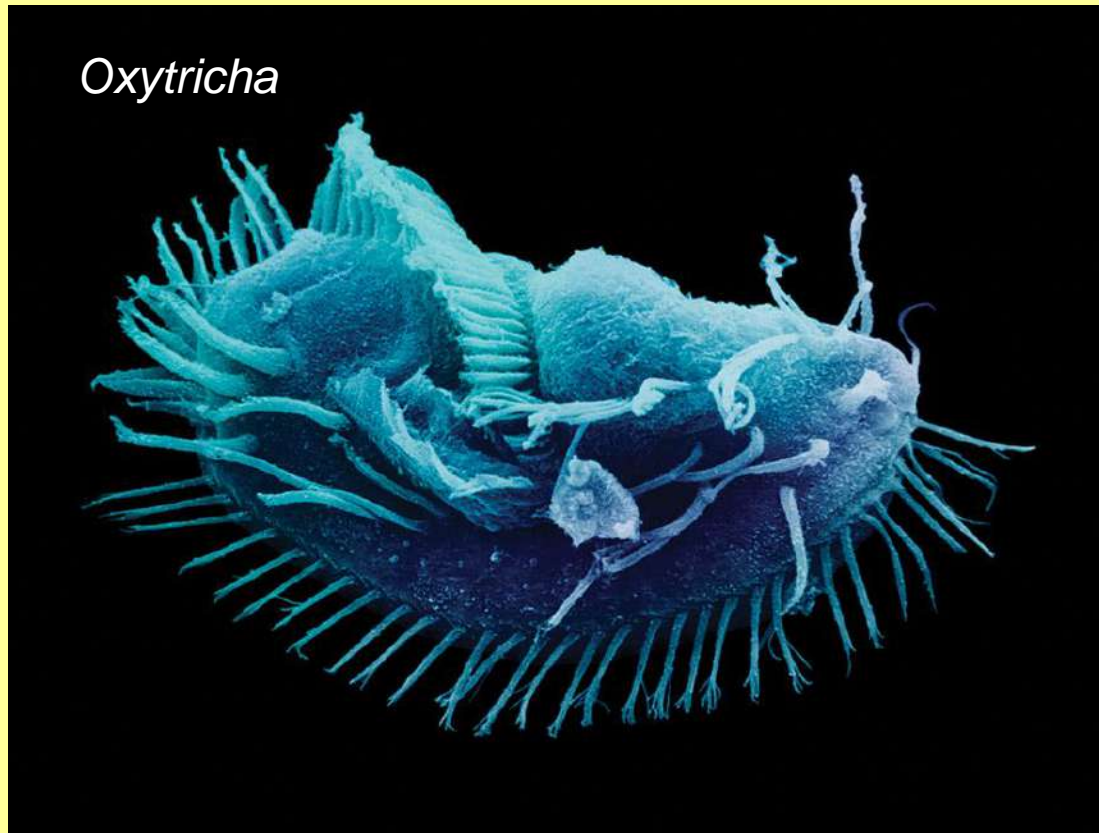


▶ **Mode of Nutrition Depends on type of protist (see Groups)**

NUTRITION	Animal Like	Plant Like	Fungus Like
REPRODUCE			
DIAGRAMS			
CLASSIFY By			
Main Groups			
How they Help man			
How they Hurt man			
Ecosystem Roles			

KEY CONCEPT

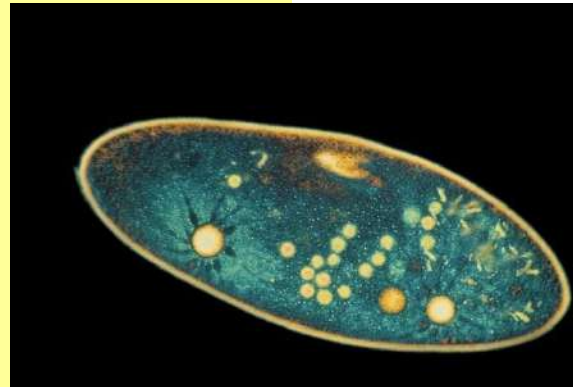
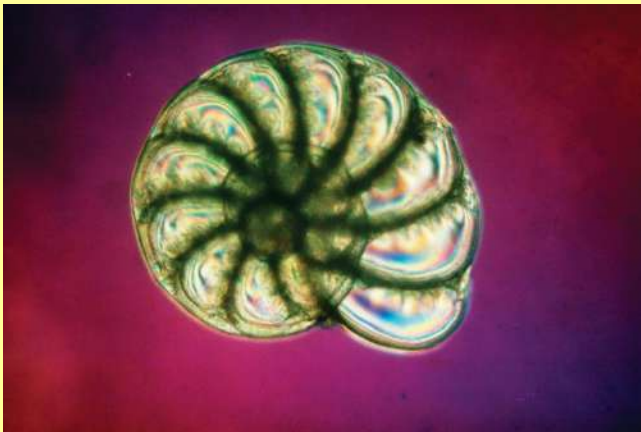
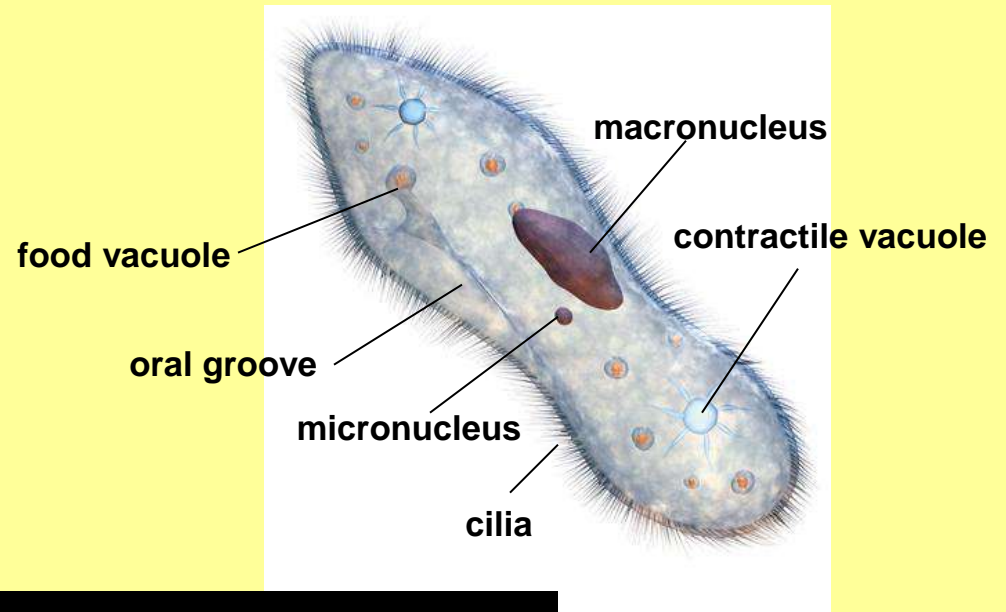
Animal-like protists = PROTOZOA, are single-celled **heterotrophs** that can move.



Reproduce How?

- **Animal like**
- Unicellular – by asexual reproduction
 - Paramecium – does conjugation to exchange genetic material

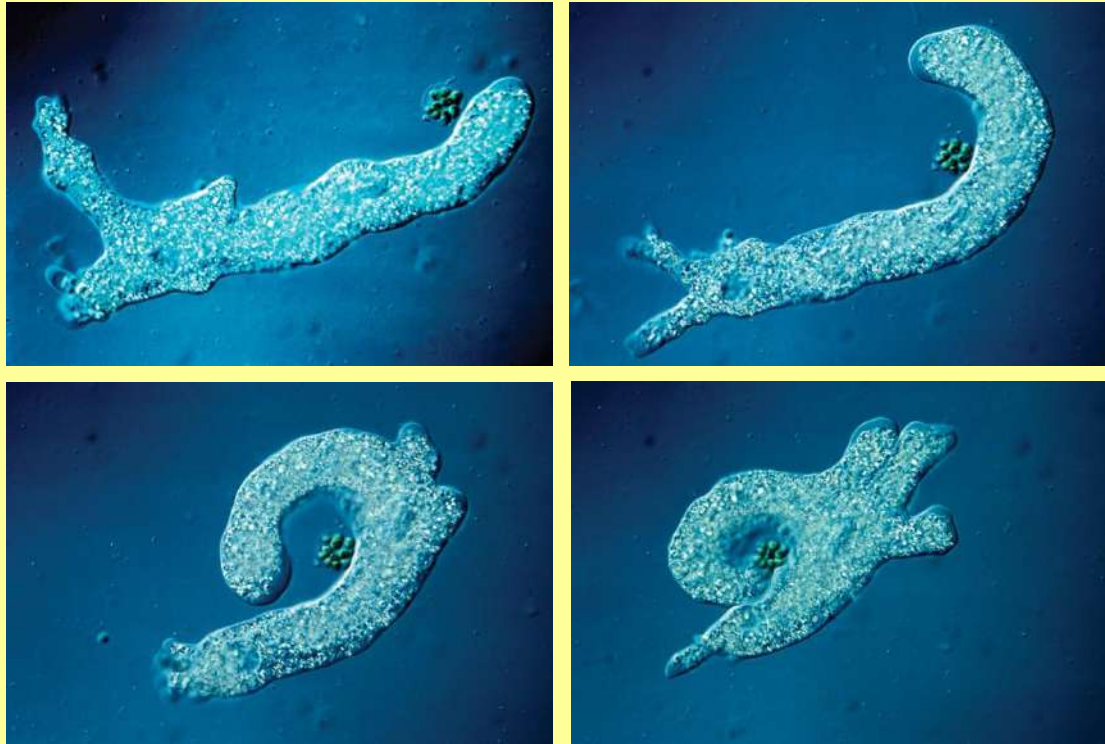
▶ Animal-like protists Classified by how they move.



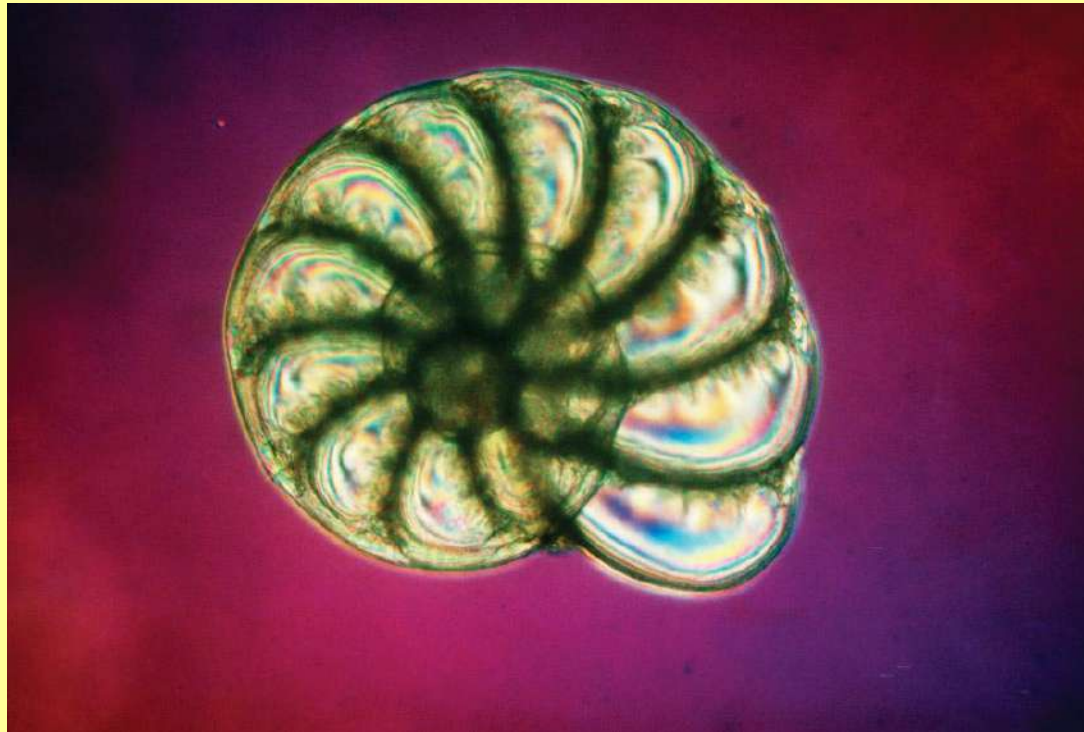
- Protozoa with **flagella** are zooflagellates.
 - flagella help zooflagellates swim
 - more than 2000 zooflagellates



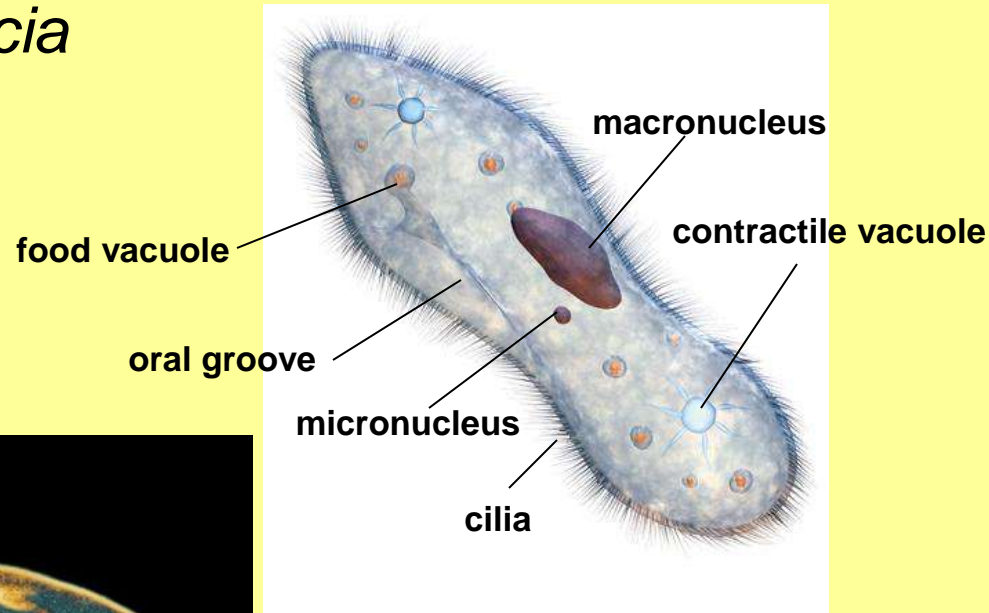
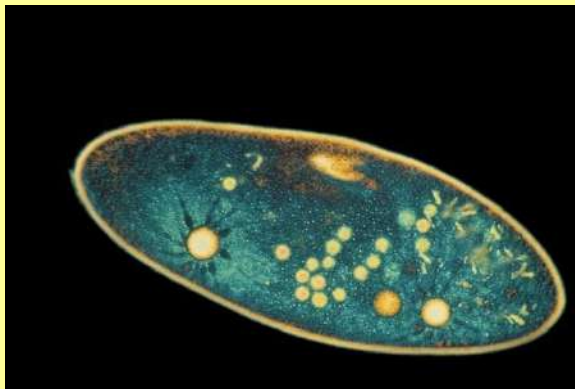
- Some protists move with **pseudopods** = “false feet”.
 - change shape as they move
 - Ex. amoebas



- Some protists move with pseudopods.
 - change shape as they move
 - amoebas
 - Ex. foraminifera = “forams”– have a multi-chambered shell, extend their pseudopods out from pores in the shell

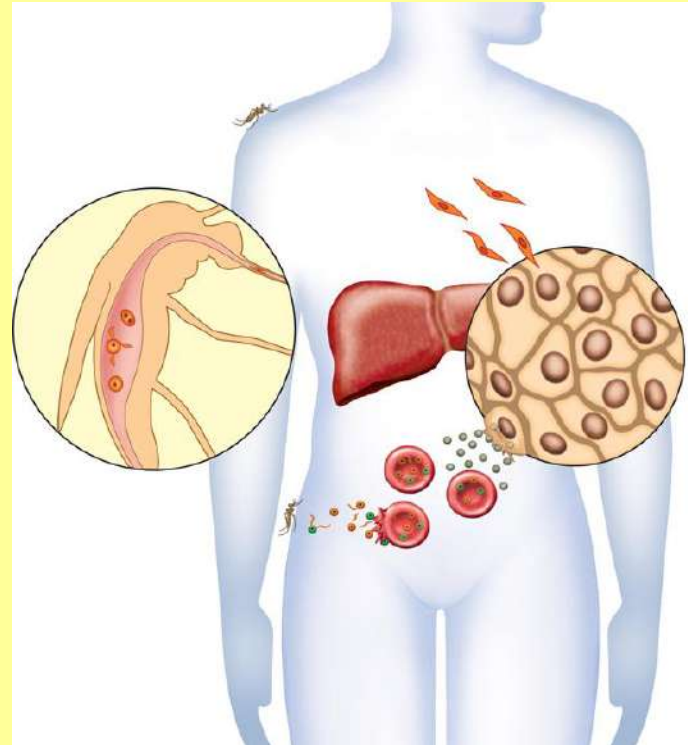


- Some protozoa move with **cilia**.
 - cilia help protists swim and capture food
 - more than 8000 ciliates
 - Ex. *Paramecia*



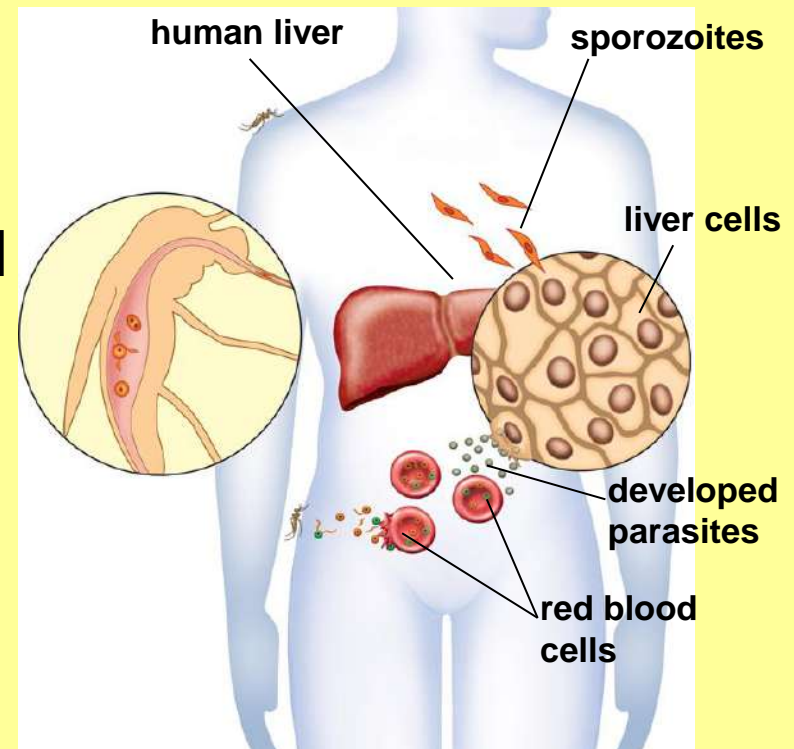
▶ Some Animal-like protists can't move by themselves

- Called “Sporozoans”
- Ex. *Plasmodium* - protist that causes malaria



▶ How they Hurt Man: Some animal-like protists cause disease.

- Protists cause some well-known infectious diseases.
- Sleeping sickness is caused by *Trypanosoma* and spread by flies.
- A giardia infection is caused by *Giardia* and spread through water.
- Malaria is caused by *Plasmodium* and spread by mosquitoes.



Malaria Infection

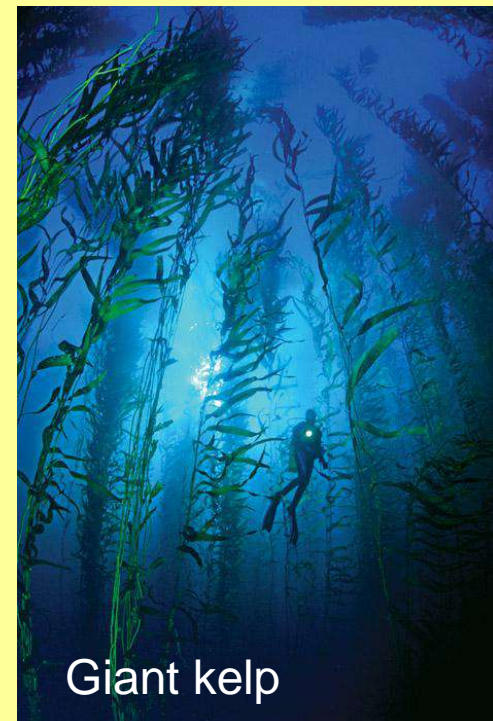
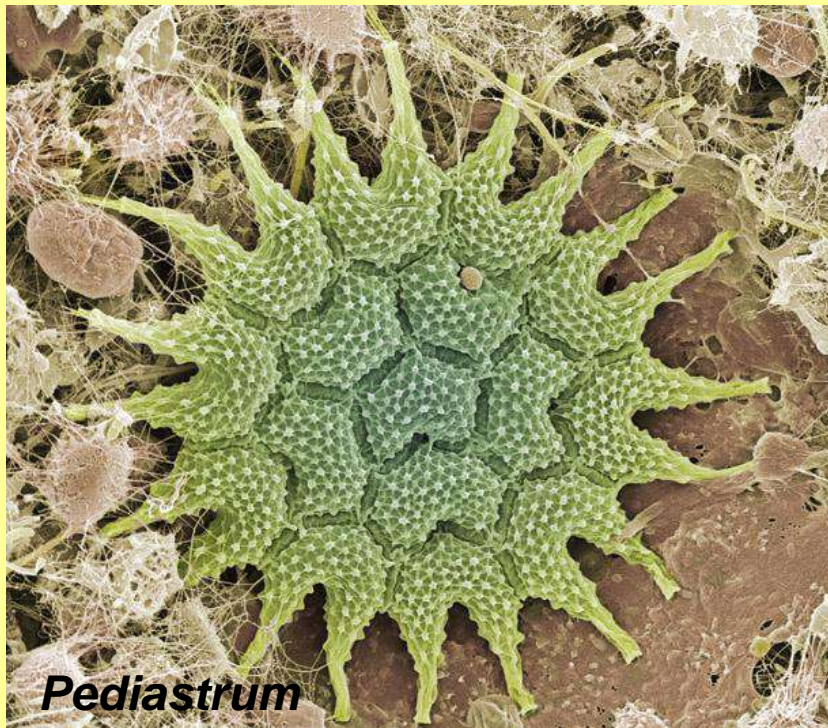
How they HELP Man

- Zooplankton: Part of ocean food chains that we are at the top of.

Special Roles in Ecosystems

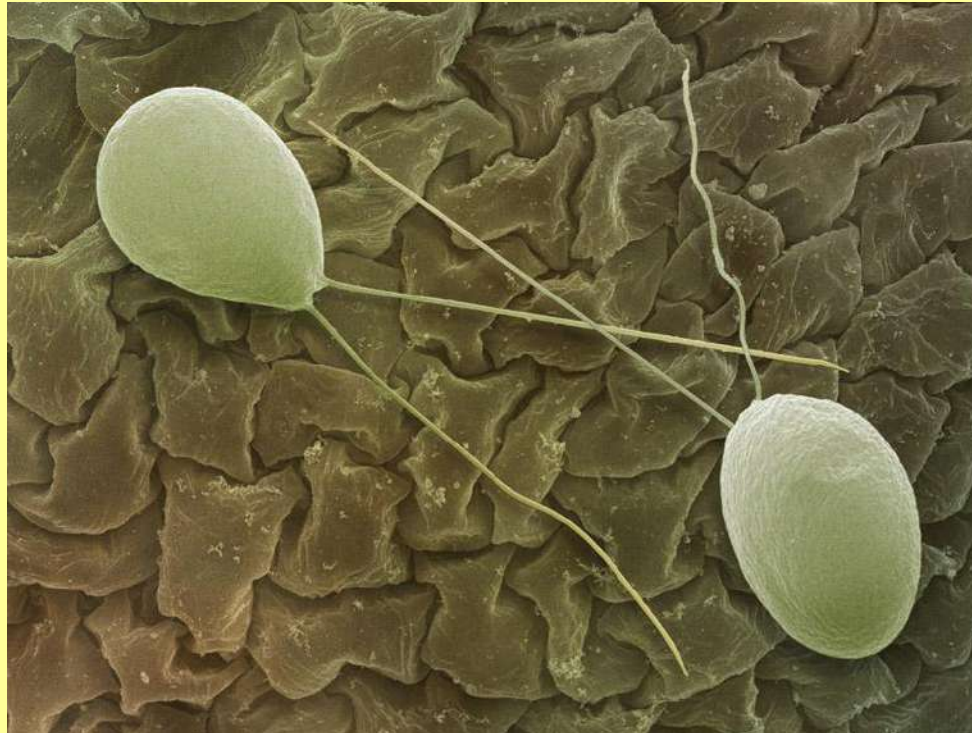
- Protozoa: Part of aquatic food chains = zooplankton

- **Plantlike protists = algae**, are photosynthetic.
 - single-celled, colonial, or multicellular
 - no roots, stems, or leaves



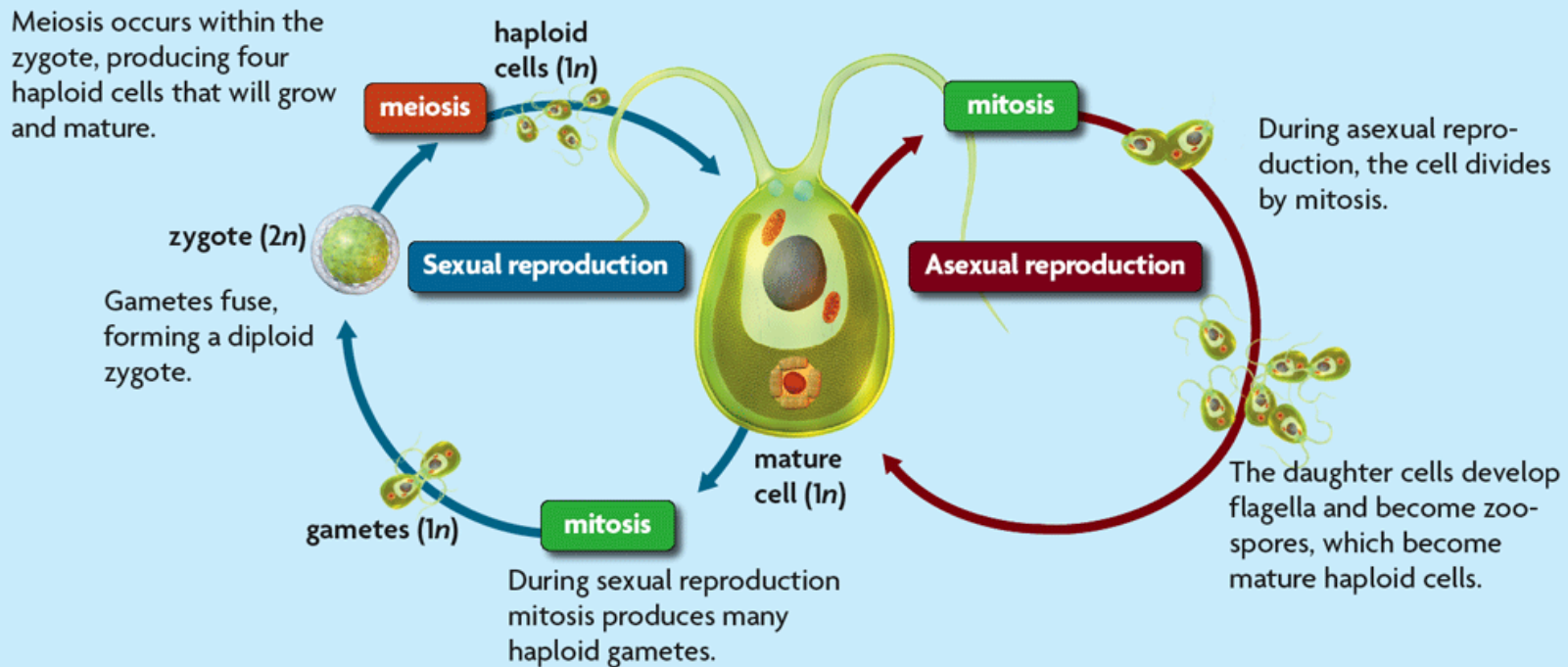
▶ Many plantlike protists can reproduce both sexually and asexually.

- All algae can reproduce **asexually**.
 - Multicellular algae can fragment.
 - *Chlamydomonas* divides into zoospores.



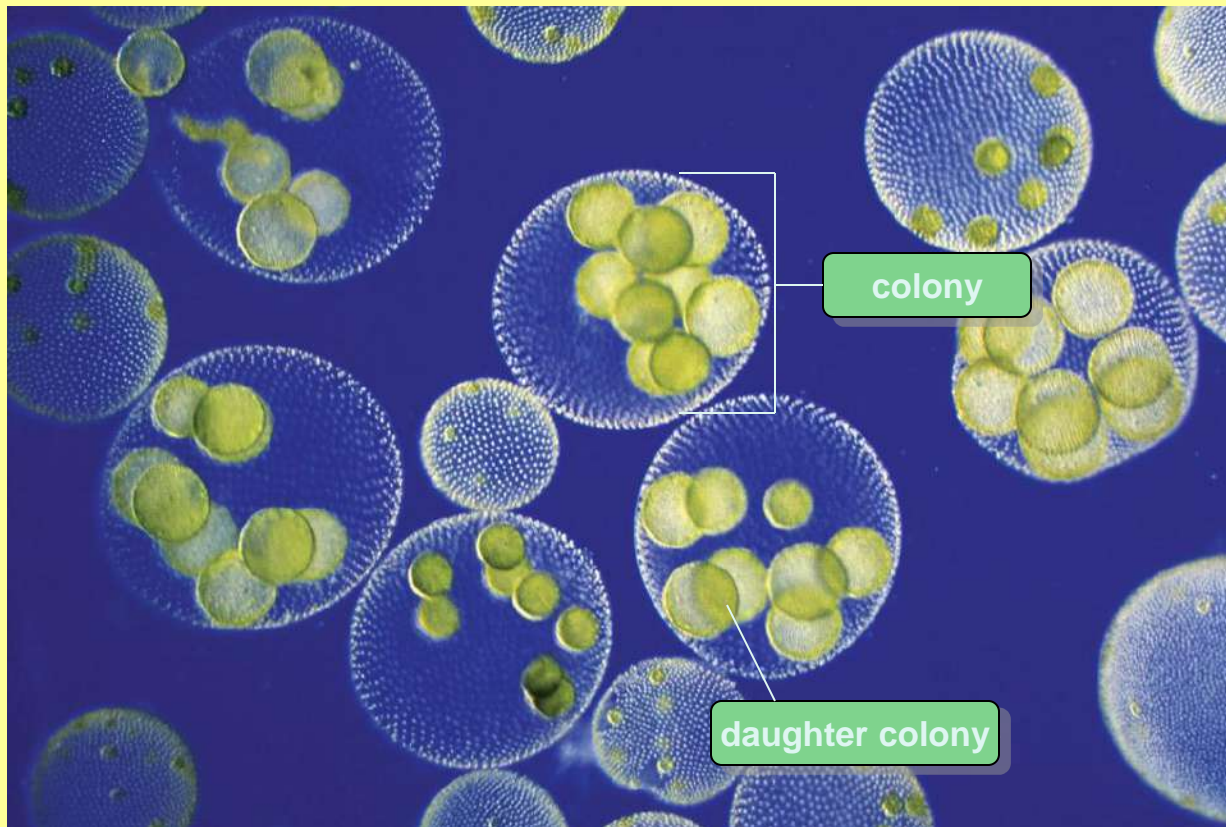
▶ Reproduce How?

- Multicellular (algae) – by sexual reproduction
 - Alternation of Generations
 - Sexual reproduction can be triggered by environmental stress. (Increases diversity, better chance some member of species will survive!)



▶ Plantlike protists can be single-celled or multicellular.

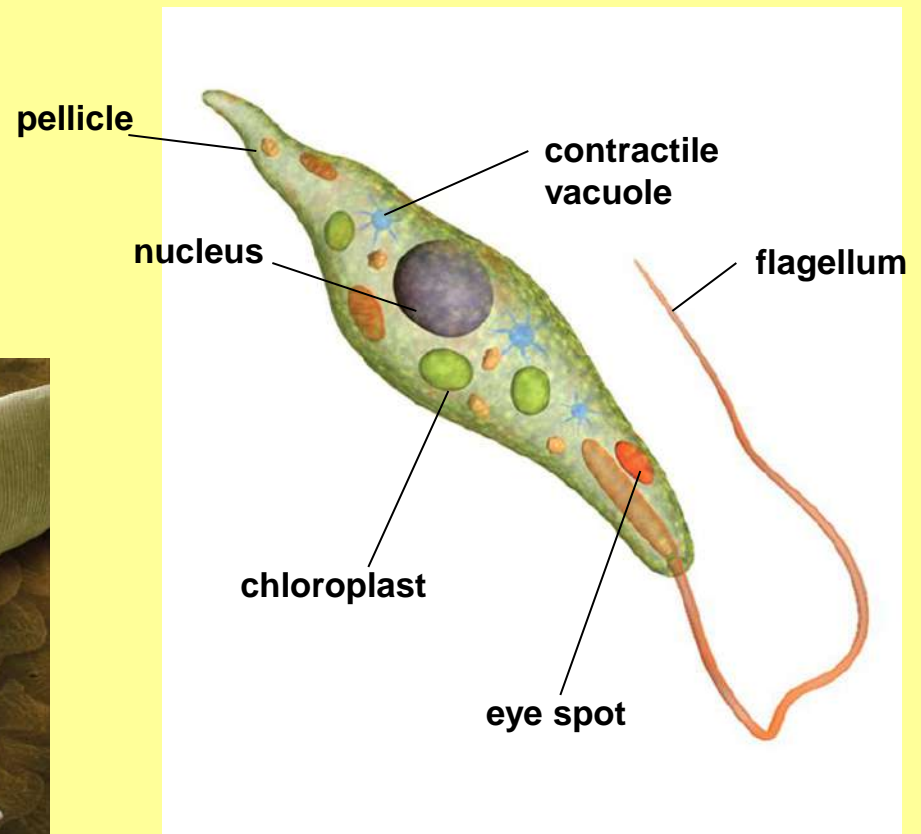
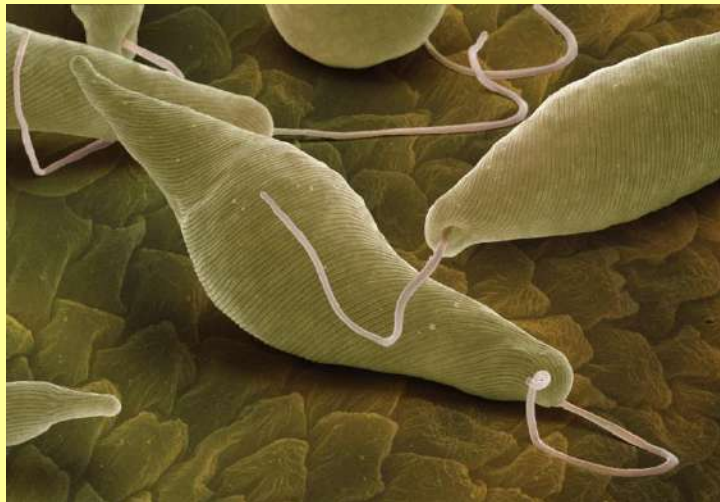
Volvox, a type of colonial algae.



▶ We classify algae by their:

- *1. Cell walls
- *2. Types of pigments
- *3. Types of storage carbs.
- *4. Diff. nucleic acid sequences
- *5 Uni-, Multicellular or Colonial

- **Euglenoids** are a large group of plantlike protists.
 - mostly photosynthetic
 - some heterotrophic
 - single-celled
 - one or two flagella



- **Dinoflagellates** are mostly marine plantlike protists.
 - have two flagella
 - may be bioluminescent
 - have stiff protective plates
 - can cause red tide



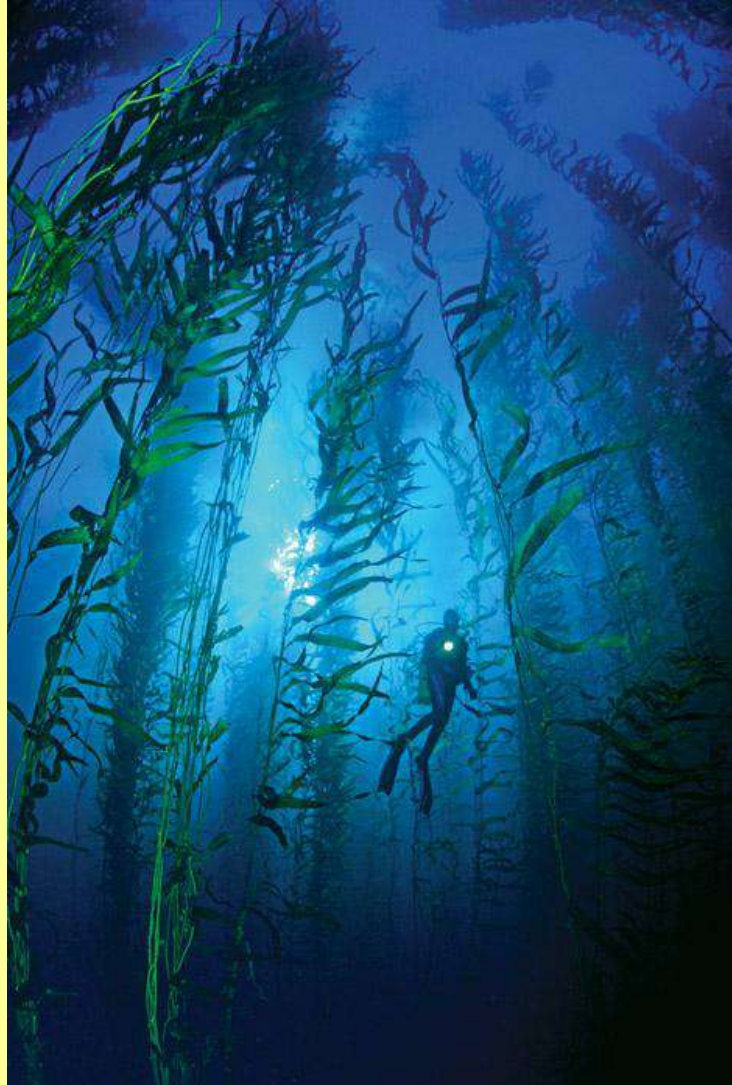
Red Tide



- **Diatoms** are plantlike protists with **glasslike shells**.
 - shells made of silica
 - produce large amounts of oxygen

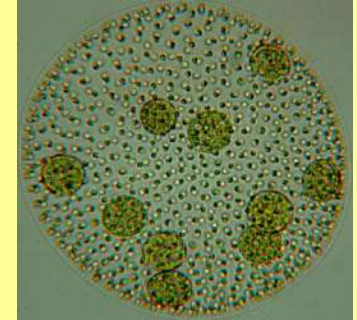


- **Multicellular algae** are classified by their **pigments**.
 - **Green algae** contain chlorophyll a and b.
 - **Brown algae** contain chlorophyll c.
 - **Red algae** contain chlorophyll a and phycoerythrin.



▶ Chlorophyta = Green algae

- Color of Pigment: Green
- Most multicelled
- Examples: *Micrasterias*-important food producer in nutrient ponds and peat bogs. *Volvox*, *Spirogyra*, and Sea Lettuce (*Ulva*)



► Phaeophyta = Brown Algae

- Color of Pigment: Brown
- All multicelled



▶ Rhodophyta = Red Algae



- Color of Pigment: Red
- Example: *Eucheuma*-used as a stabilizer in paints, dairy products, and many other emulsions, *Carrageenan*, *Porphyra*, *Nori* - Beneficial



How they HURT Man

Algae: Some algal blooms, including “red tides”, kill fish

How they HELP Man

- Algae: We eat some types, and they are used to make many products

Special Roles in Ecosystems

- Algae: Make Oxygen
- Algae: Basis of aquatic food chains = phytoplankton

- **Funguslike protists** decompose dead organisms.
 - heterotrophs
 - can move, whereas fungi cannot (which is why they are not classified in the Fungi Kingdom)



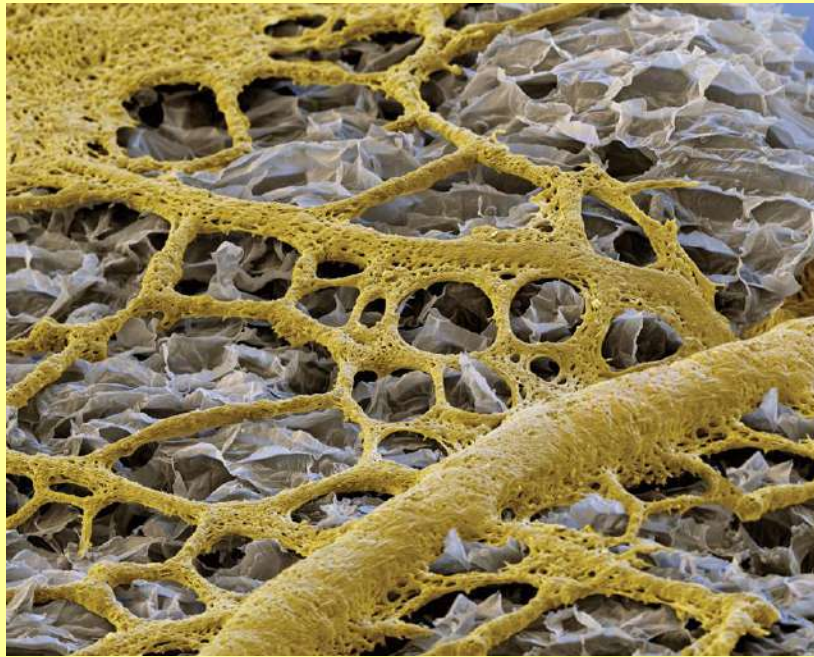
▶ Slime molds and water molds are funguslike protists.

- **Slime molds** have both funguslike and animallike traits.
 - decomposers, like fungi
 - can move, like animals

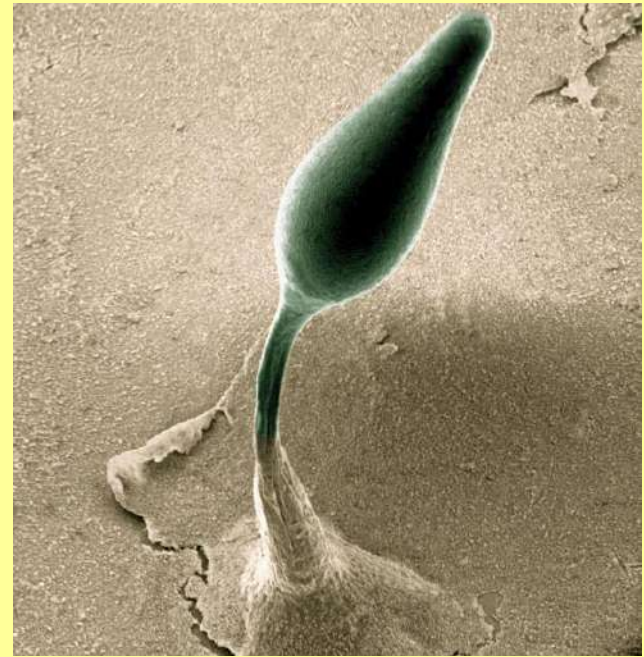


Fuligo septica, common name “dog vomit” slime mold

- Slime molds can be **plasmodial** or **cellular**.
 - **Plasmodial** slime molds are giant cells with many nuclei.
 - **Cellular** slime molds contain independent cells.



Plasmodial slime molds



Cellular slime molds

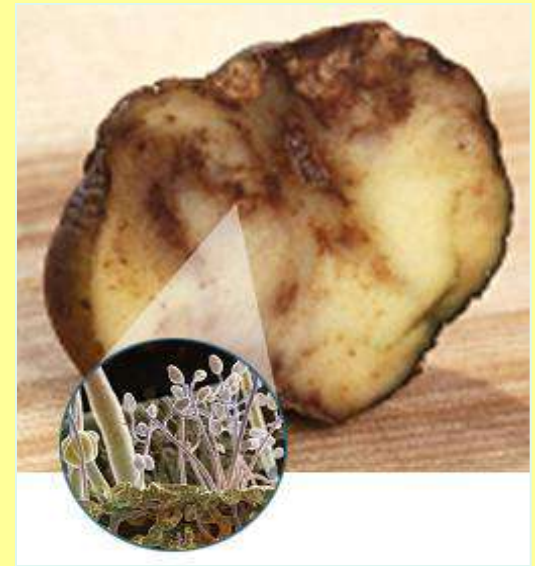
- **Water molds** are freshwater, funguslike protists.
 - one type of water mold caused Great Potato Famine of Ireland in the 1800's
 - made of branching strands of cells
 - can be **parasites** of plants or fish



Phytophthora infestans

▶ How they HURT Man

- Fungus-like: Can attack crops and fish
 - Potato famine of Ireland
 - “Cottonmouth” disease in tropical fish



▶ Special Role(s) in Ecosystems

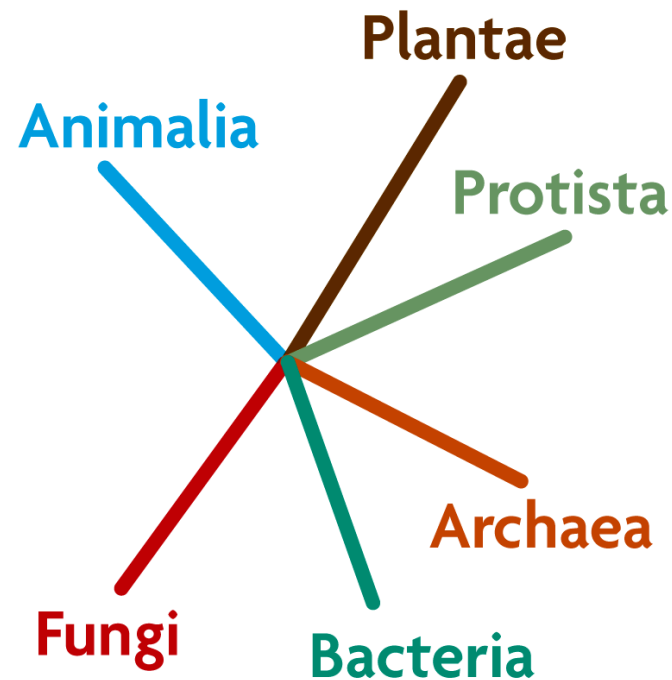
- Fungus-like: Part of nature's decomposers in moist habitats and ponds



▶ Protists are difficult to classify.

- Protista is one kingdom in the domain Eukarya.

1977 Six kingdoms



- Protist classification **will likely change**.
 - Some protists are not closely related.
 - **Molecular evidence** supports reclassification.

