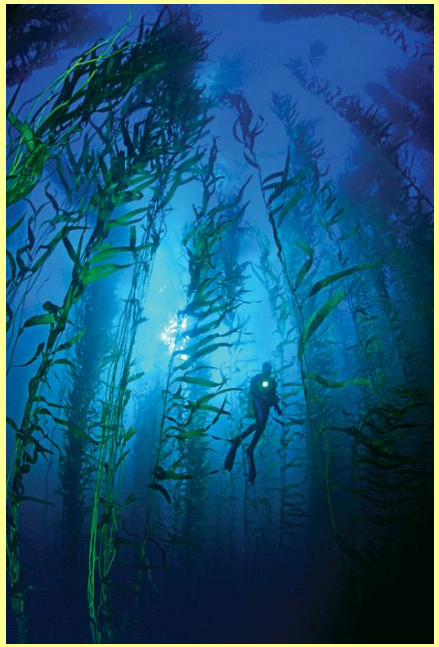
Biology Chapter 19

Kingdom
Protista

Domain
Eukarya



Description

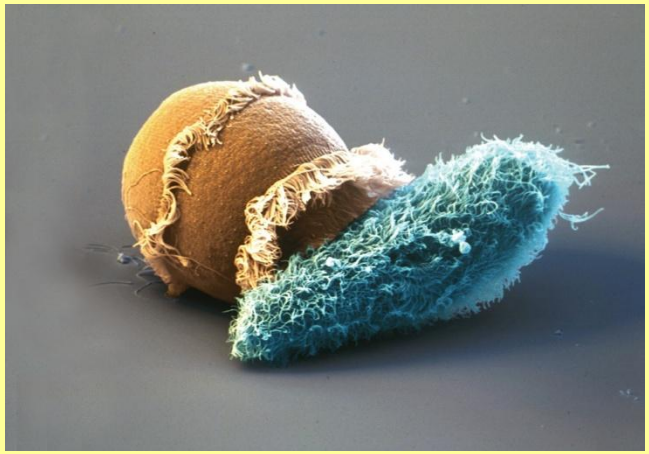
Kingdom Protista is the <u>most diverse</u> of all the kingdoms.

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

Some unicellular, some multicellular.

Some autotrophs, some heterotrophs.

Some with cell walls, some without.



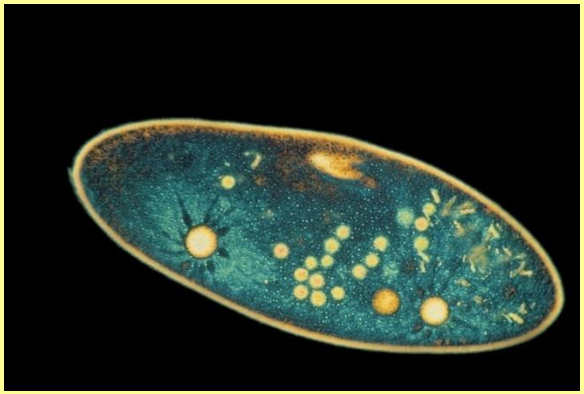
Didinium protist devouring a *Paramecium* protist that is longer than it is! Read about it on p. 573!

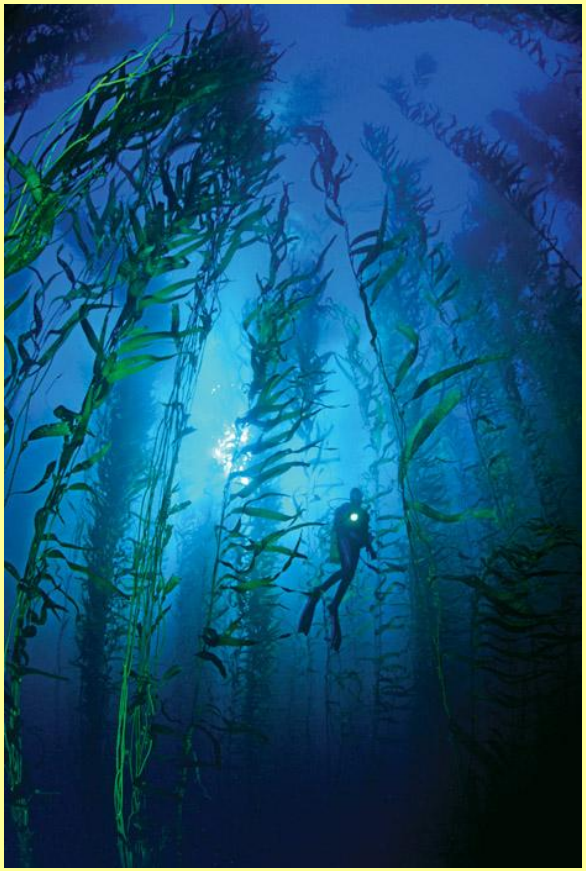
Where Do They Live?

- 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			

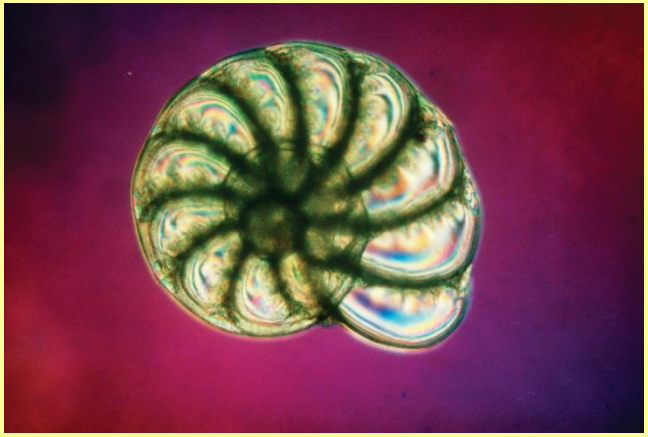
KEY CONCEPT

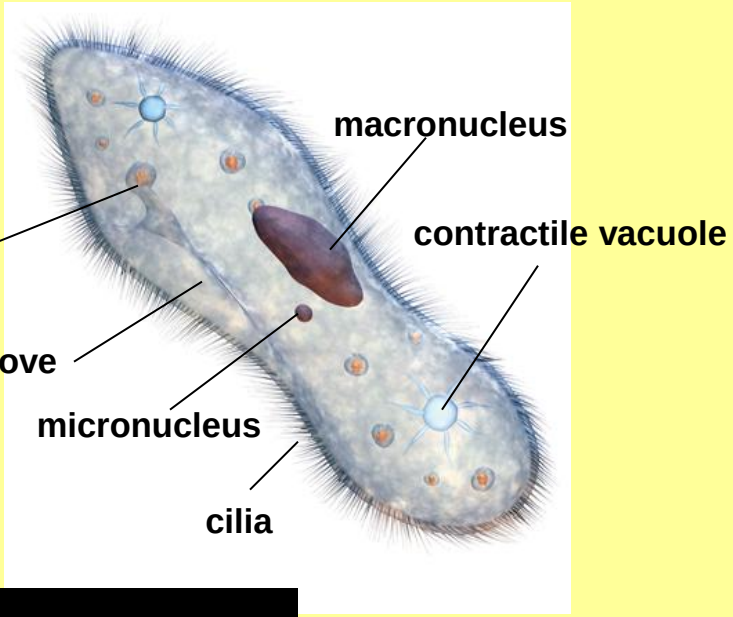
Animal-like protists = PROTOZOA, are single-celled heterotrophs that can move.

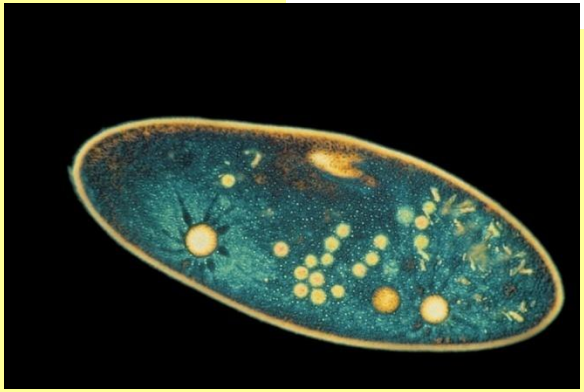
Reproduce How?

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

Animal-like protists Classified by how they move.

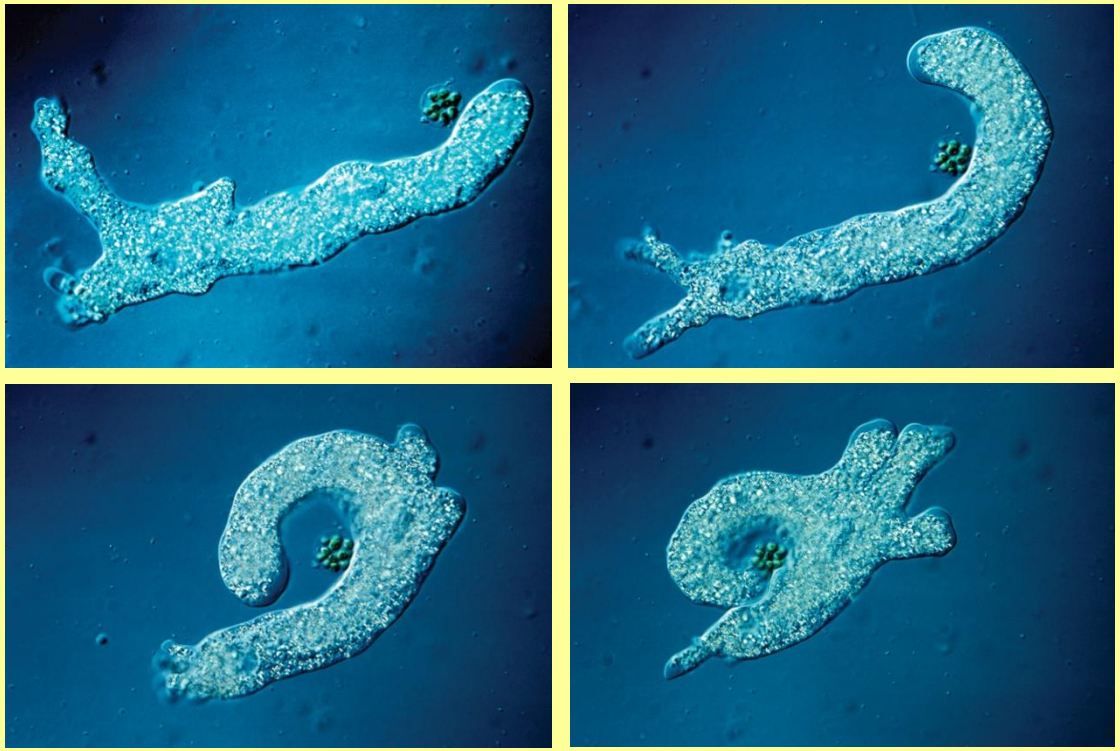




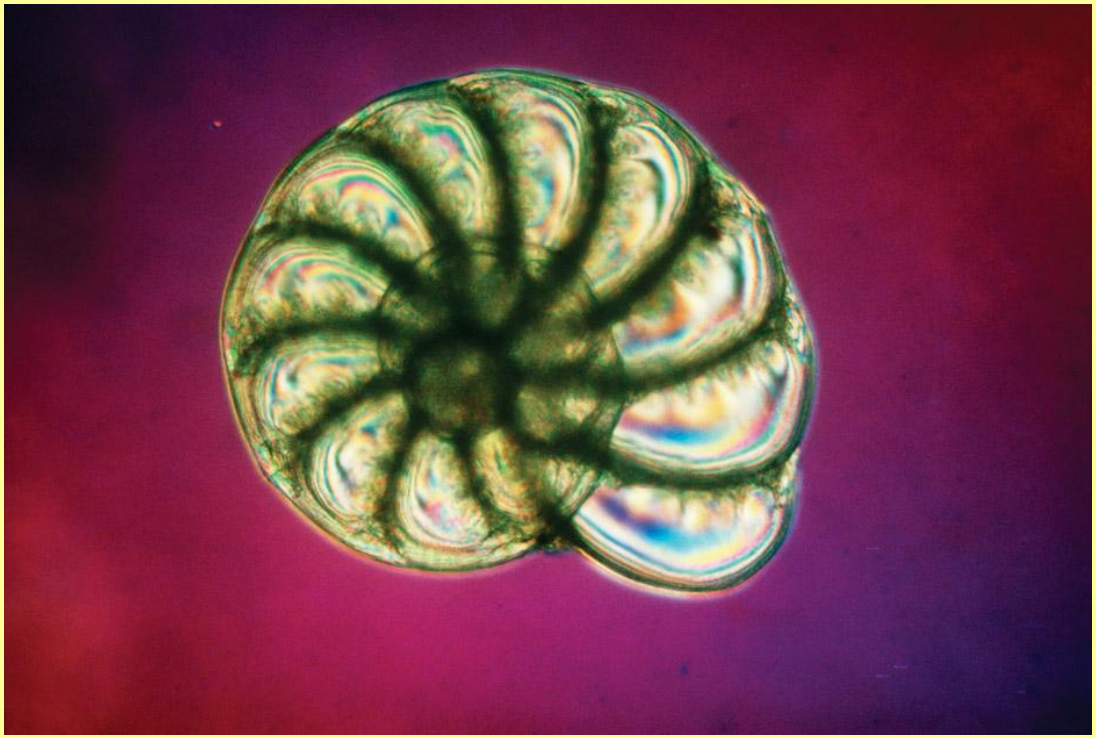


- Protozoa with **flagella** are zooflagellates.
  - flagella help zooflagellates swim
  - more than 2000 zooflagellates

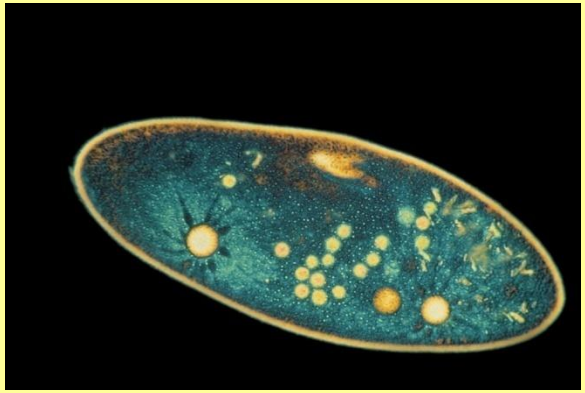
- Some protists move with **pseudopods = “false feet”.**
  - change shape as they move
    - Ex. amoebas

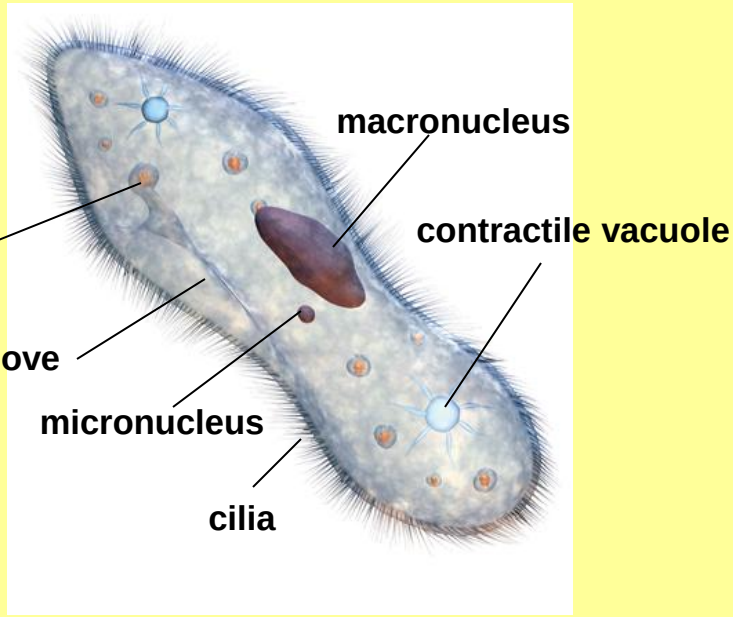


- Some protists move with pseudopods.
  - change shape as they move
  - amoebas
  - Ex. foraminifera = “forams”– have a multi-chambered shell, extend their pseudopods out from pores in the shell

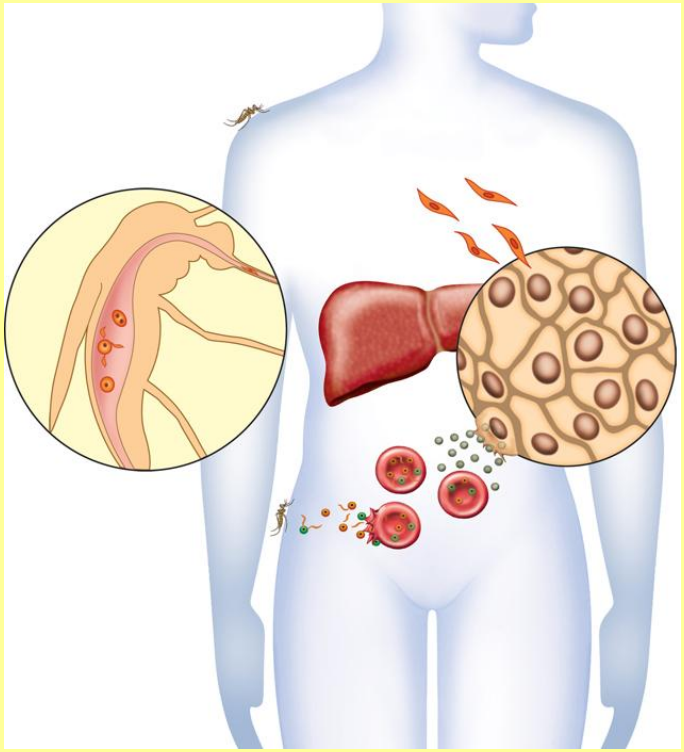


- Some protozoa move with **cilia.**
  - cilia help protists swim and capture food
  - more than 8000 ciliates
  - Ex. *Paramecia*





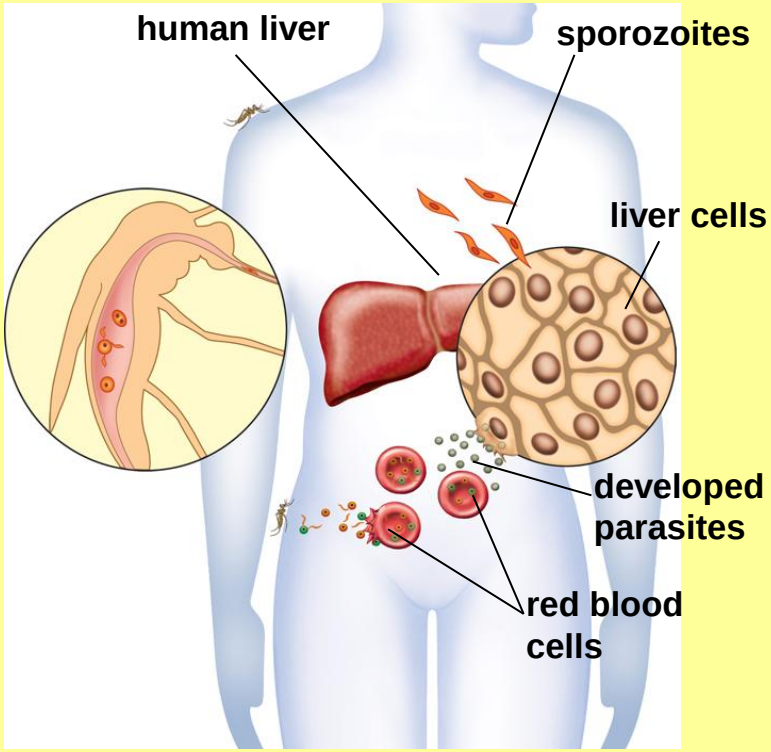
- **Some Animal-like protists can't move by themselves**
  - Called "Sporozoans"
  - Ex. *Plasmodium* - protist that causes malaria



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

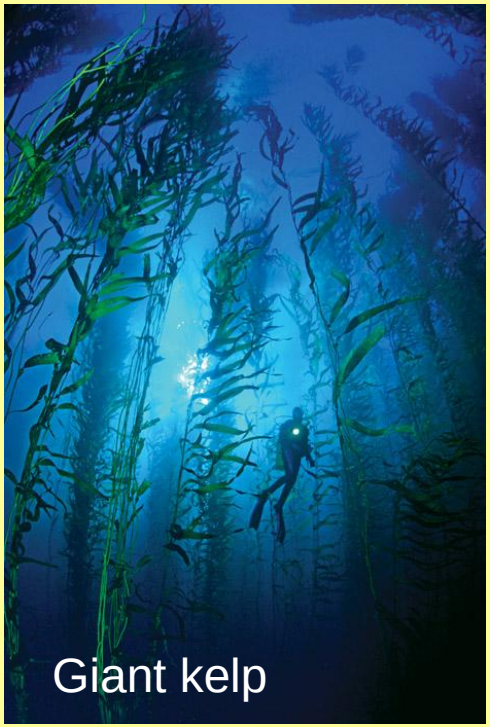
- Zooplankton: Part of ocean food chains that we are at the top of.

Special Roles in Ecosystems

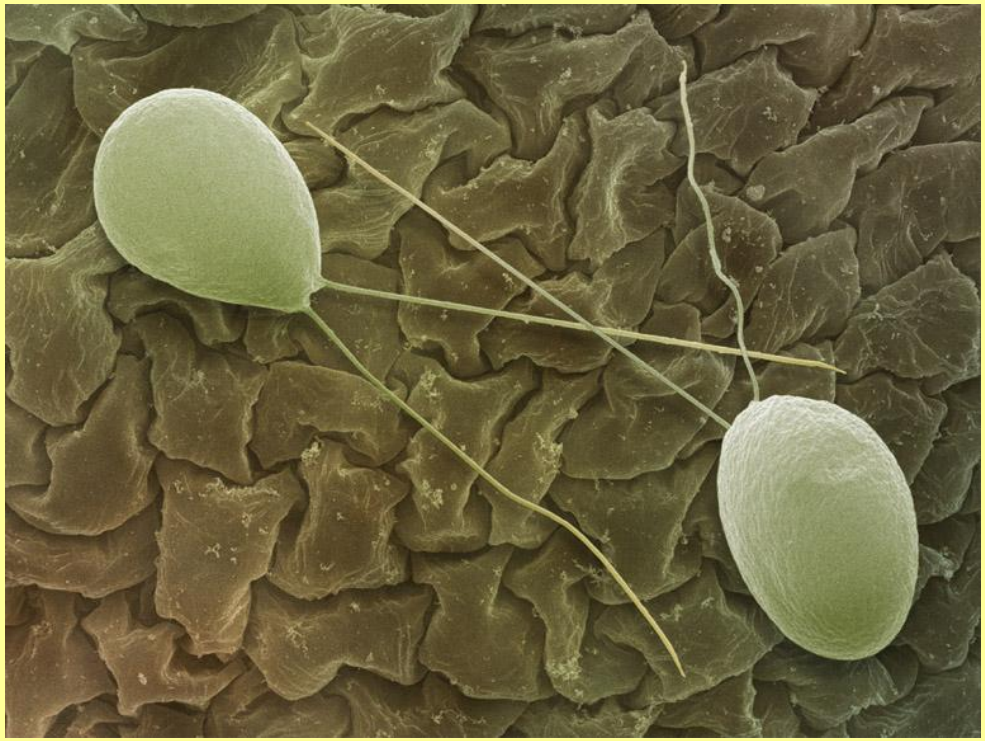
- Protozoa: Part of aquatic food chains = zooplankton

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


Pediastrum

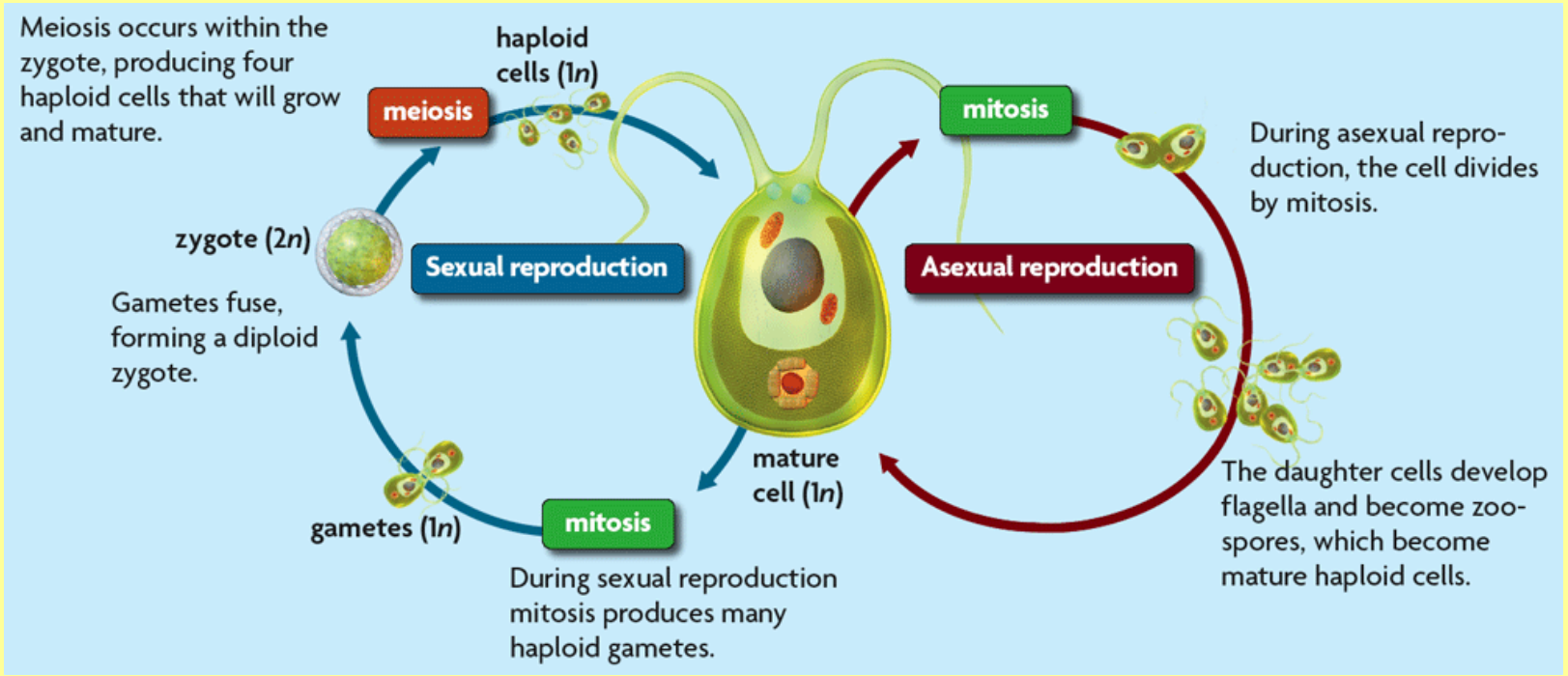

Giant kelp

- **Many plantlike protists can reproduce both sexually and asexually.**
  - **All** algae can reproduce **asexually**.
    - Multicellular algae can fragment.
    - *Chlamydomonas* divides into zoospores.



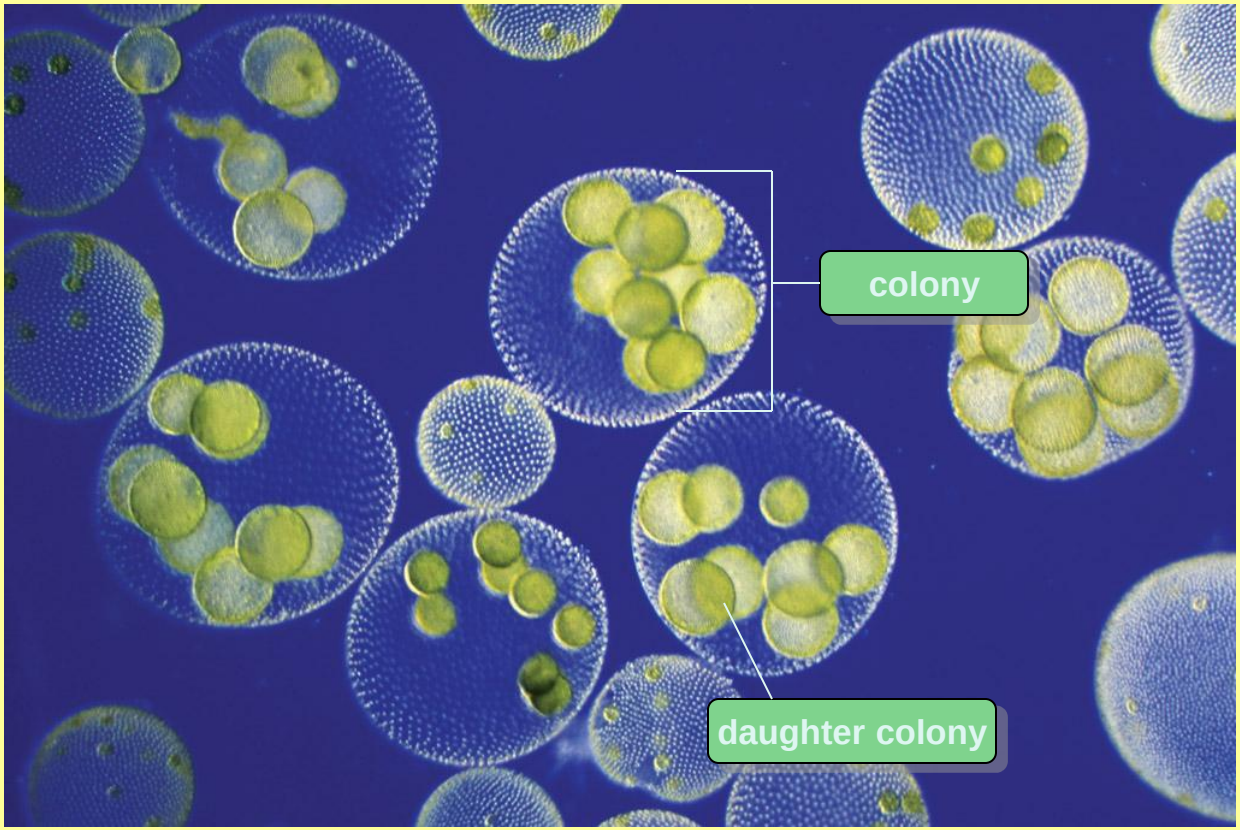
Reproduce How?

- Mulitcellular (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.**

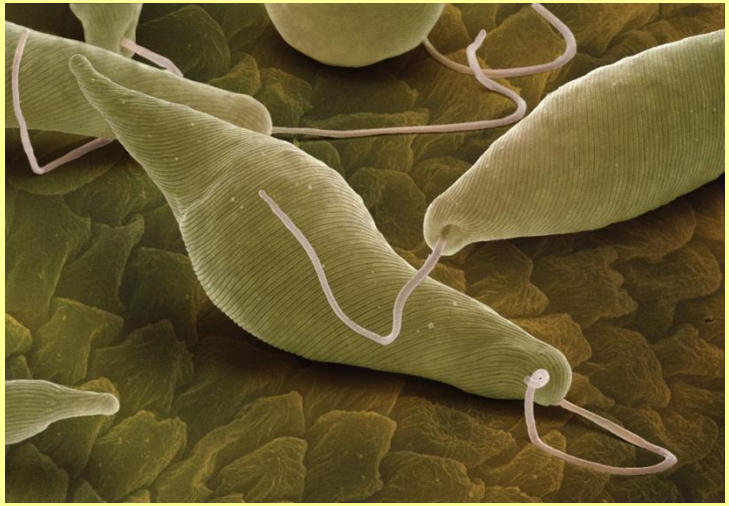
Volvox, a type of colonial algae.

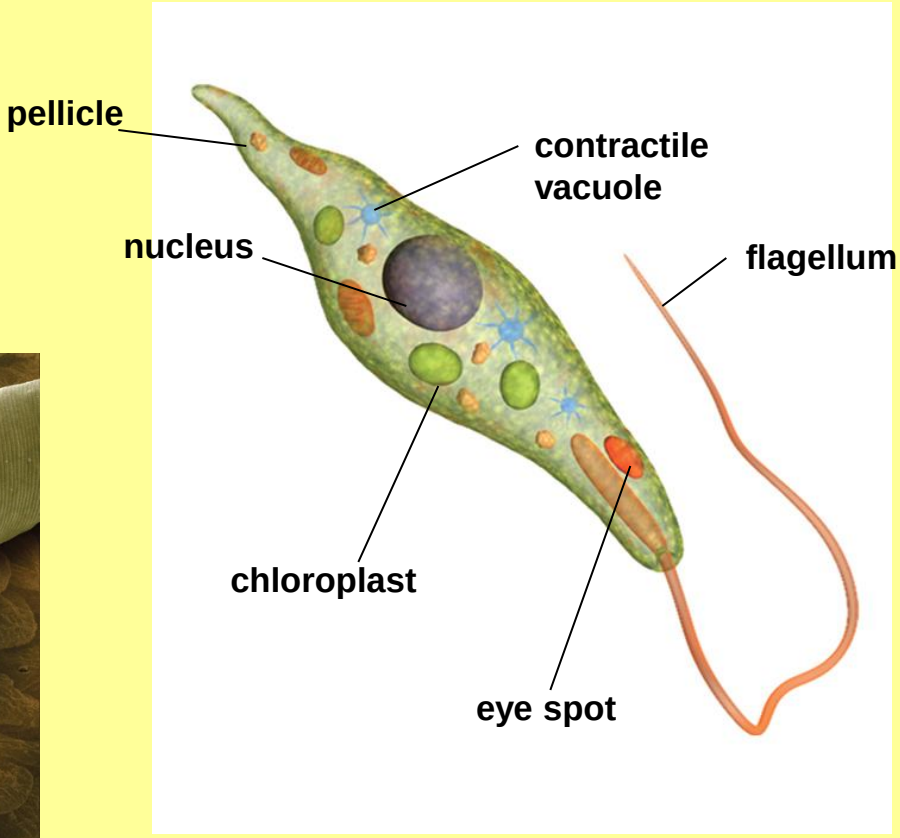


- We classify algae by their:

  - *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.

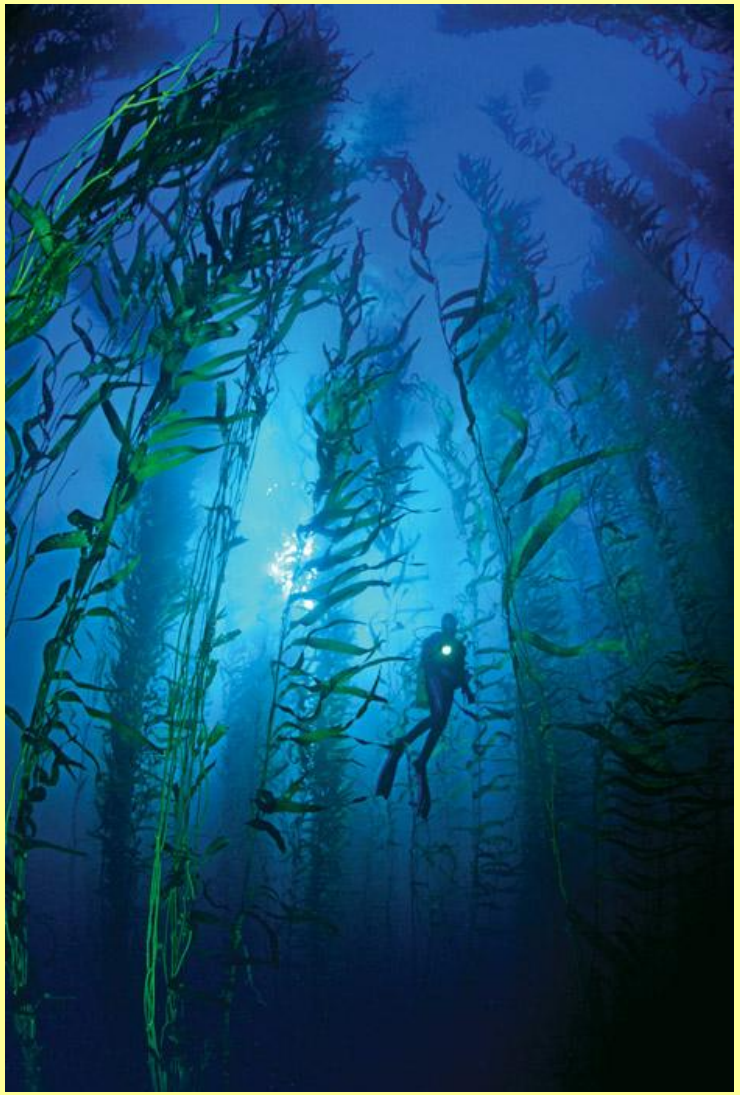
– have two flagella
– may be bioluminescent
– have stiff protective plates
– can cause red tide

Red Tide

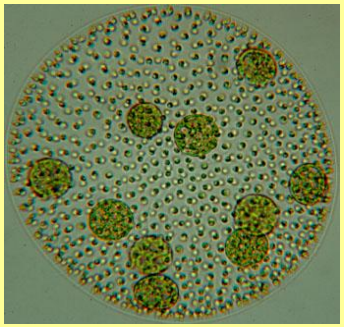
- **Diatoms** are plantlike protists with **glasslike shells**.
  - shells made of silica
  - produce large amounts of oxygen



- **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: *Euchema*-used as a stabilizer in paints, dairy products, and many other emulsions, *Carrageenan, Porphya, 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

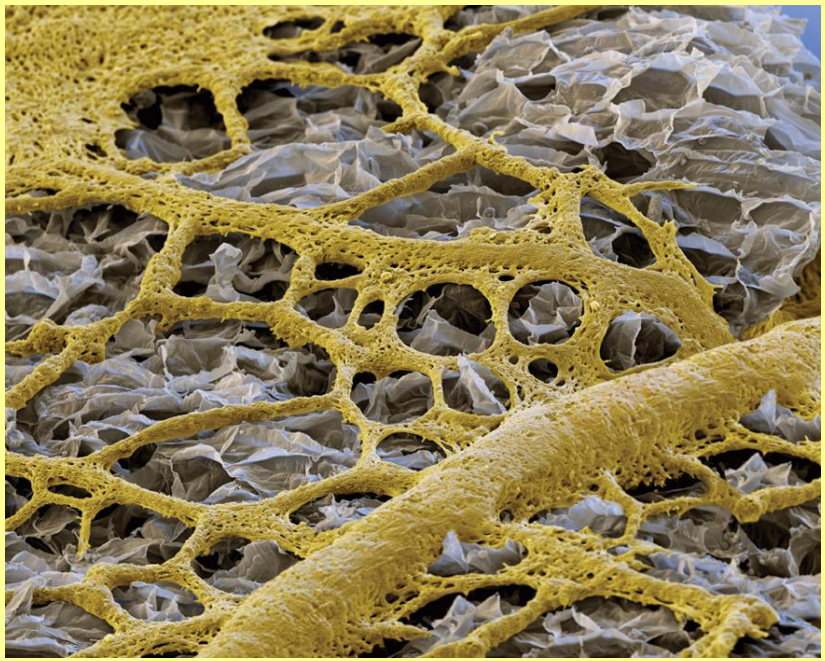
- **Funguslike protists** decompose dead organisms.
  - heterotrophs
  - can move, whereas fungi cannot (which is why they are not classified in the Fungi Kingdom)

Slime molds and water molds are funguslike protists.

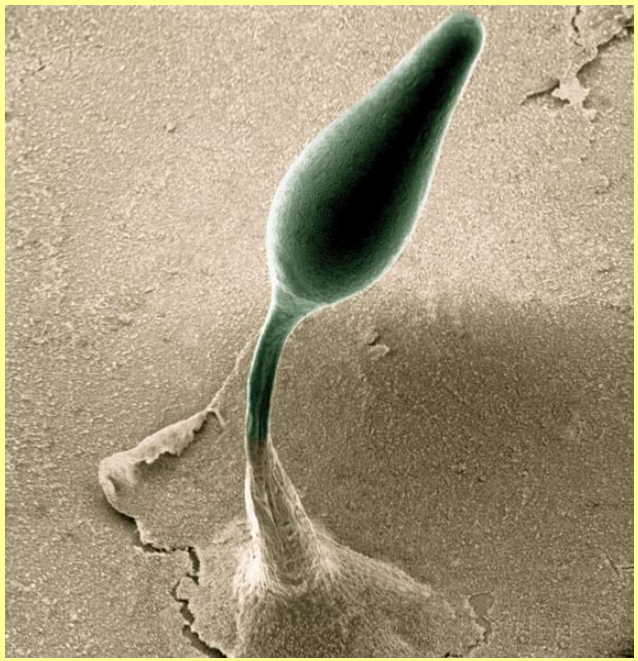
- **Slime molds** have both funguslike and animallike traits.
  - decomposers, like fungi
  - can move, like animals

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

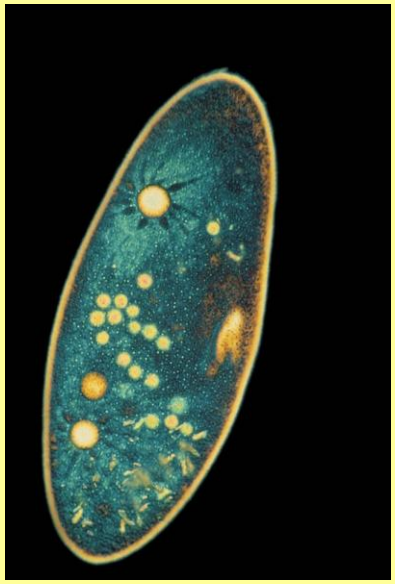
Phytophthora infestans

How they HURT Man

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

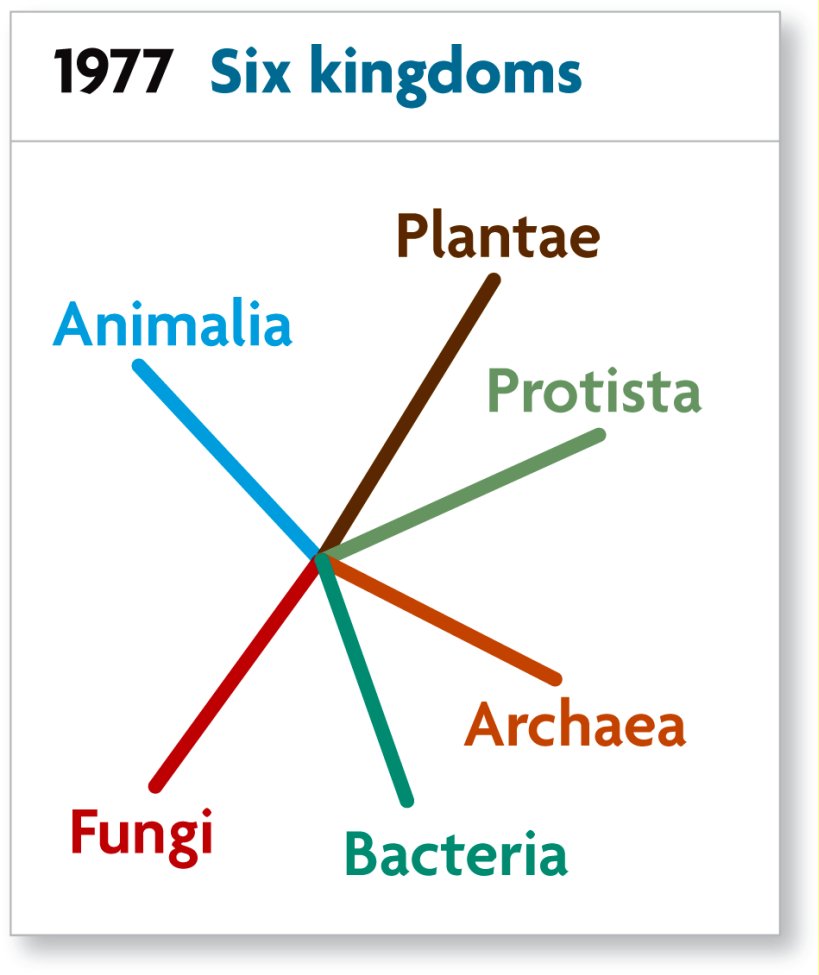
Special Role(s) in Ecosystems

- 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.



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