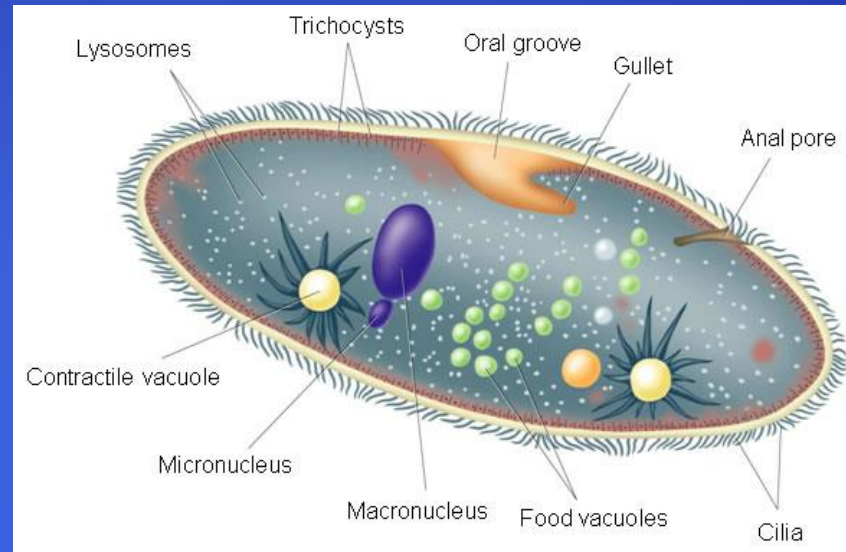
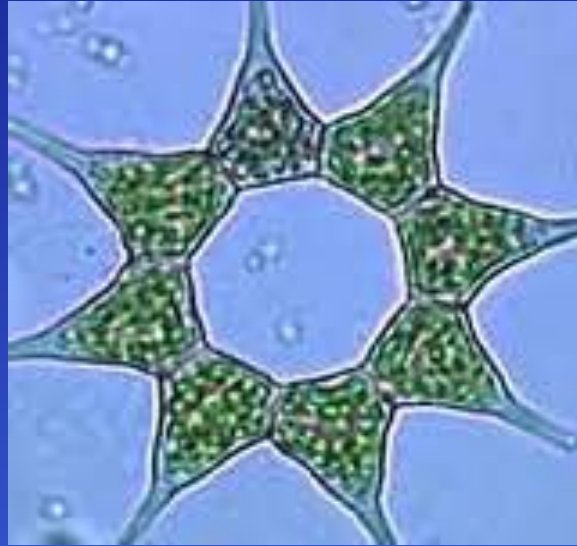


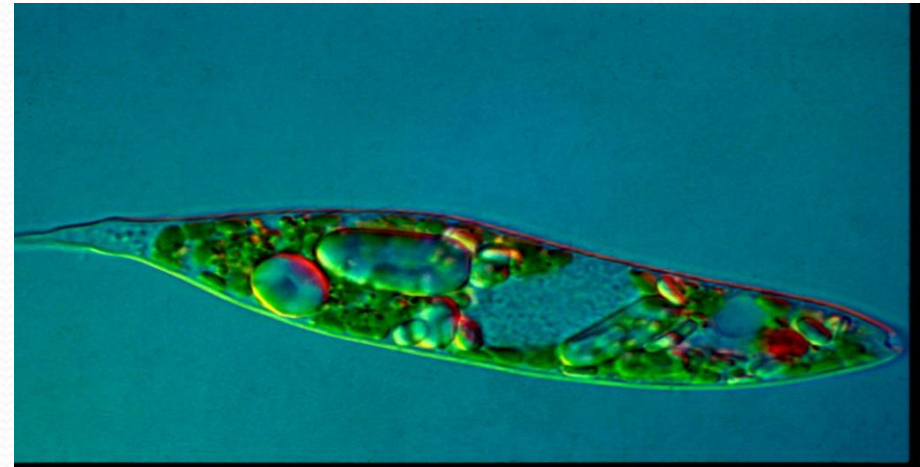
# Kingdom Protista



# General Characteristics of Protists

- Protists are:
  - Eukaryotic
  - Unicellular
  - Most solitary, though some colonize.
  - Some Autotrophic, some Heterotrophic
  - Share characteristics with plants, animals and fungi.
  - Primarily aquatic.

# Two types of Protists



- **Zooplankton**: (Left) – **Animal like**, **capture** their own food, **Heterotrophic**. (Paramecium)
- **Phytoplankton**: (Right) – **Plant like**, produce their own food, **Autotrophic**. (Euglena)

# Animal-Like Protists

- They are classified based on their type of movement, how they feed and how they reproduce.
- Phylum Zoomastigina
- Phylum Sarcodina
- Phylum Ciliophora
- Phylum Sporozoa

# Phylum Zoomastigina – flagella bearing

- Commonly called **flagellates**.
- **Absorb** food through their cell membrane.
- Found in **lakes**, **ponds**, or as **parasites** or **symbionts** of other organisms.
- Reproduction:
  - Sexually Via **Meiosis**
    - formation of gametes.
  - Asexually Via **Binary Fission**.

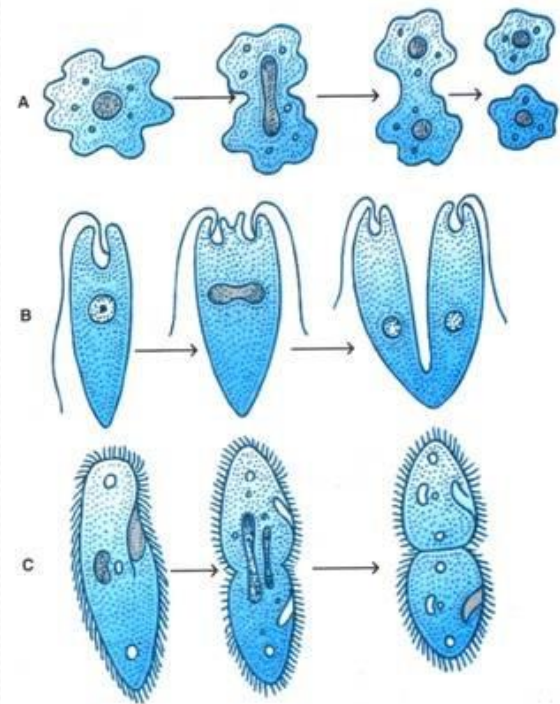
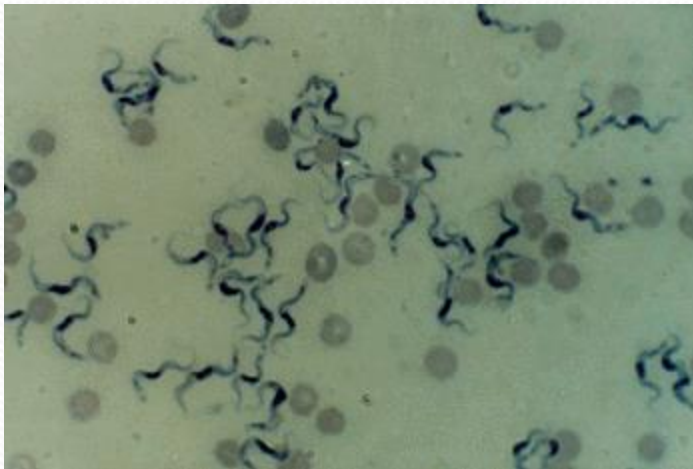
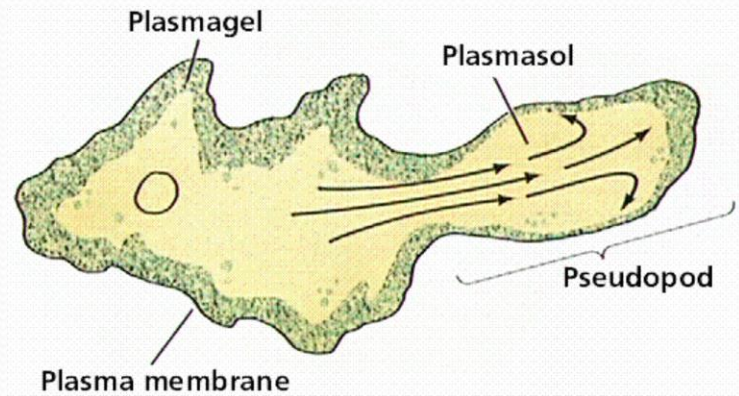


Fig. 1.3. Types of Binary fission in Protozoa. A. Irregular in *Amoeba*; B. Longitudinal in *Euglena*; C. Transverse in *Paramecium*.

## Phylum Sarcodina: Protists with False Feet

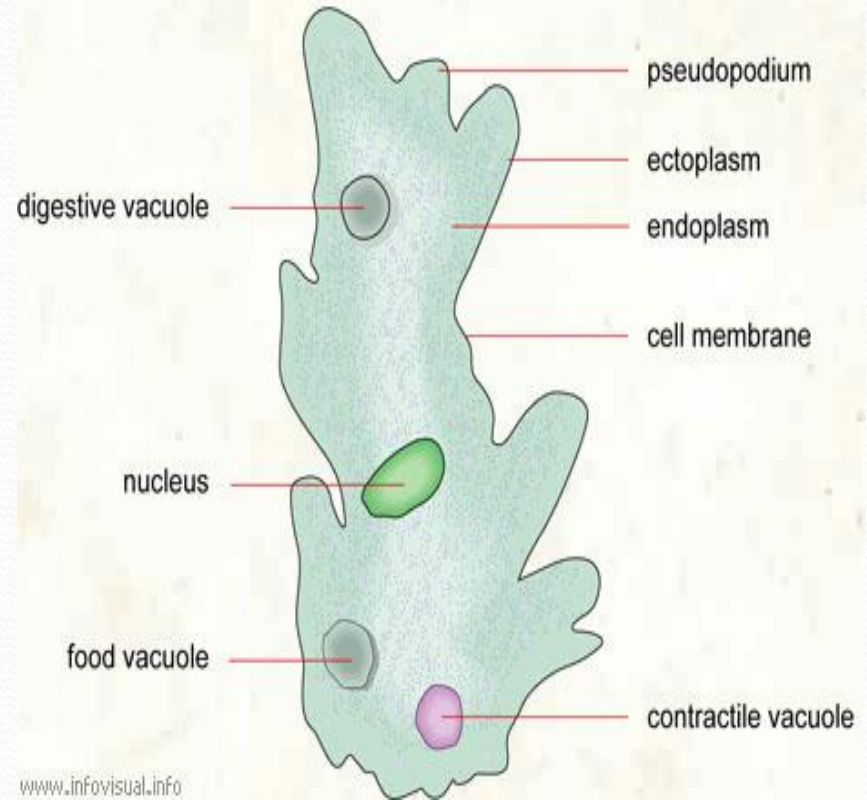
- **Pseudopod** is Latin for “false foot”, which is a temporary **extension** of the **cytoplasm**.
- This is used for **feeding** and **movement**.
- **Sarcode** is the root of the phylum name, it means “**jelly**”.



## Phylum Sarcodina Cont.

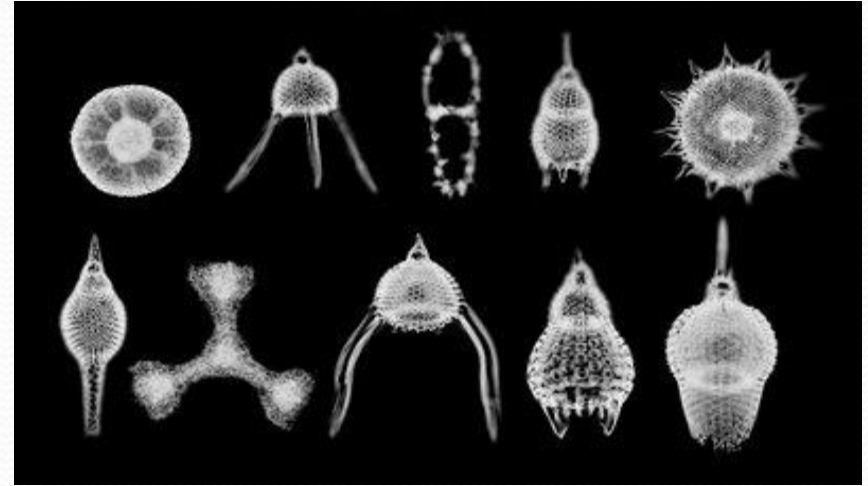
- Major family is the Amoeba.
  - Use pseudopods to move, called amoeboid movement.
  - Eats by surrounding its prey with pseudopods and engulfing it, called Endocytosis “Into the cell”

STRUCTURE OF AN AMOEBIA



# Other Sarcodina Examples

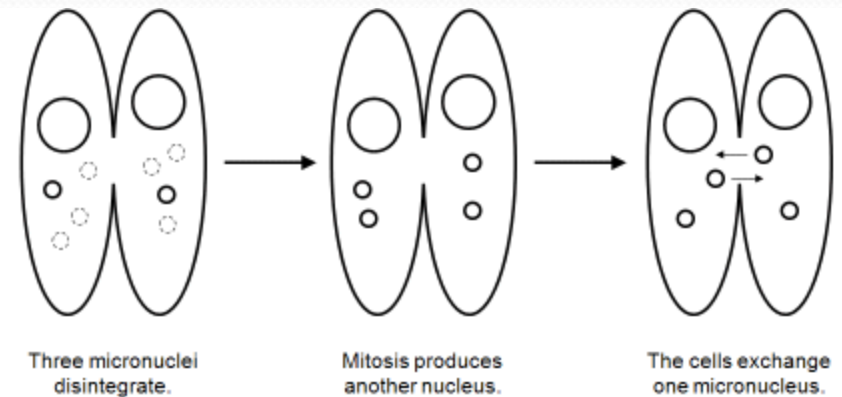
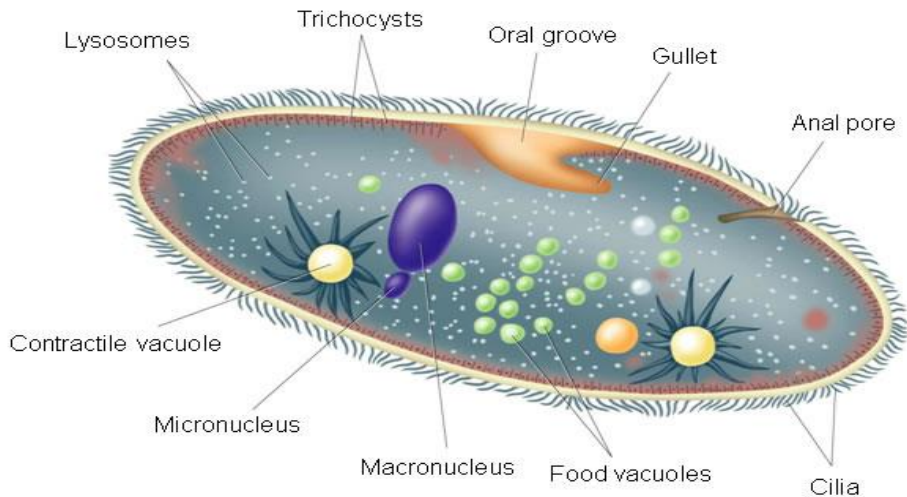
- Radiolarians- produce delicate shells of silica.
- Foraminiferas- secretes a shell of Calcium Carbonate.
  - Form most of the ocean floor soil, helped form most of the worlds oil deposits
  - Grit in our toothpaste 😊
  - Make up the white cliffs of Dover





# Zooplankton – Phylum Ciliophora

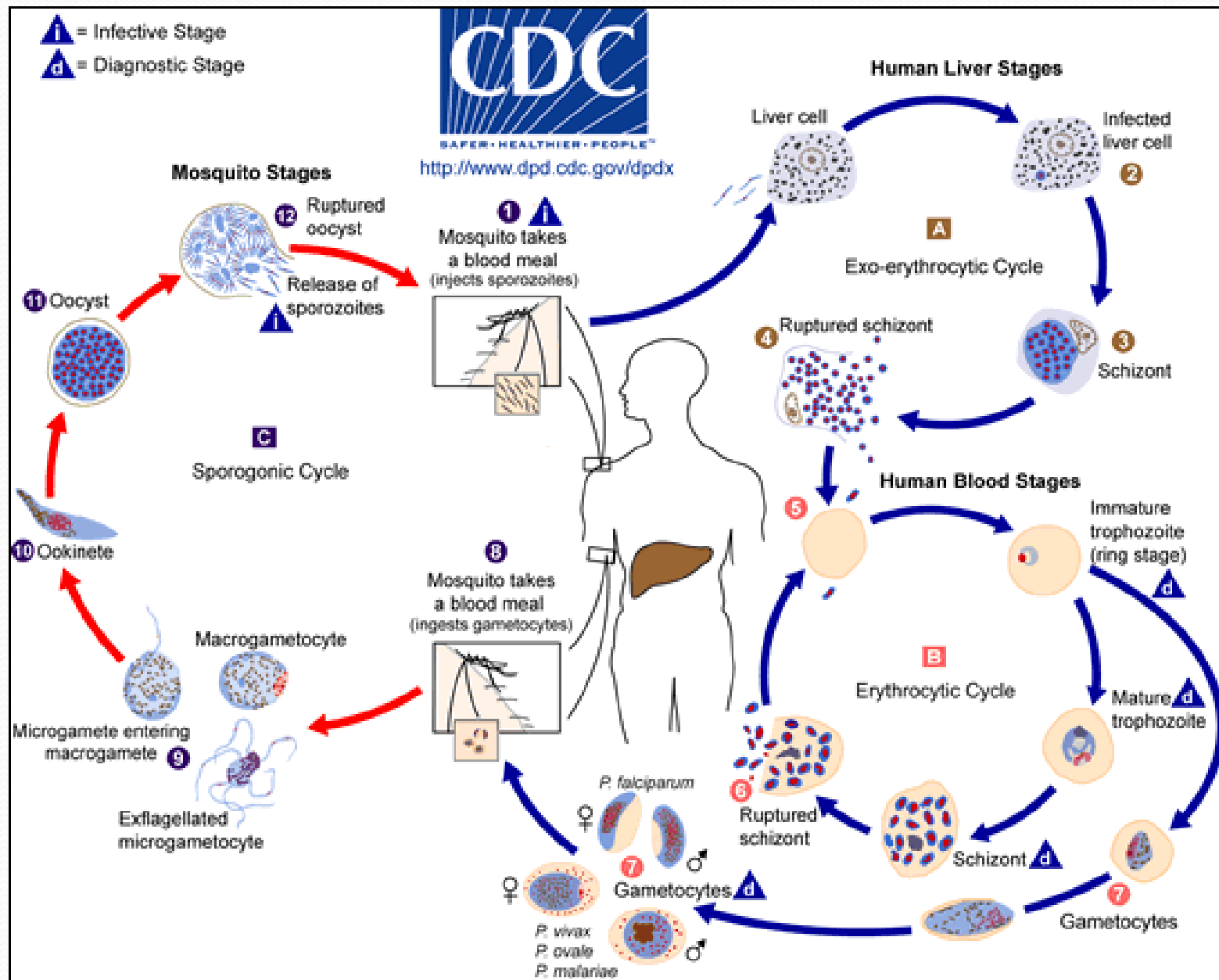
- As the name suggests, these are named for their **presence** of **cilia** (hair like projections) that produce **movement**.
- They are both **solitary** and **colonial**.
- The genus Paramecium is most common.
  - Reproduce asexually by **binary fission**.
  - Sexual reproduction via **conjugation**.



## Phylum Sporozoa : Spore producing parasitic protists

- **Non** Motile
- All are **parasitic**
- **Complex** life cycles that involve more than one host.
- Reproduce using **spores**.
  - Spores attach to **host** cell, **penetrate** it, then **live** within it as a parasite.
  - Plasmodium causes **malaria** (see p 388, 18.10)
  - Plasmodium are **resistant** to some drugs, so **mosquito breeding** areas must be **controlled**.

# Plasmodium Life Cycle



# Harmful Relationships:

- Plasmodium (sporozoa) causes Malaria.
- Trypanosoma (Zoomastiginan) causes African Sleeping Sickness.
- Entamoeba (Sarcodinan) Causes Amoebic Dysentery.

# Helpful Relationships:

- Trypanosoma (Zoomastigote) lives in termite guts and helps digest cellulose cell walls in wood.
- Zooplankton in ocean acts as food, part of the food chain.

# Protista Table – 9 Phyla

Yes you will need to complete this table for marks to be handed in. The first 3 are done for you please write them in the table provided

Phyla Name	Type	Movement	Reproduction	Feed
(1) Cilophora Pg. 384	Animal	Cilia	Asexual- BF Sexual – Conj	Cilia guide food to the oral groove and then into the gullet, once inside, food is digested buy enzymes in vacuoles and then circulated through the organism. ☺ Squint more ☺
(2) Zoomastigina Pg. 386	Animal	Flagella	Asexual – BF Sexual-Meiosis makes gametes	Absorb food through their cell membranes or can act as parasitic organisms.
(3) Sarcodina Pg. 389	Animal	Pseudopodia	Read coloring sheet. No don't copy that down... its not the answer.	<u>Endocytosis</u> ... need I say more, you better find out what that word means.

# Plant-Like Protists

- Phylum Euglenophyta
- Phylum Pyrrophyta
- Phylum Chrysophyta

# Plantlike Protists

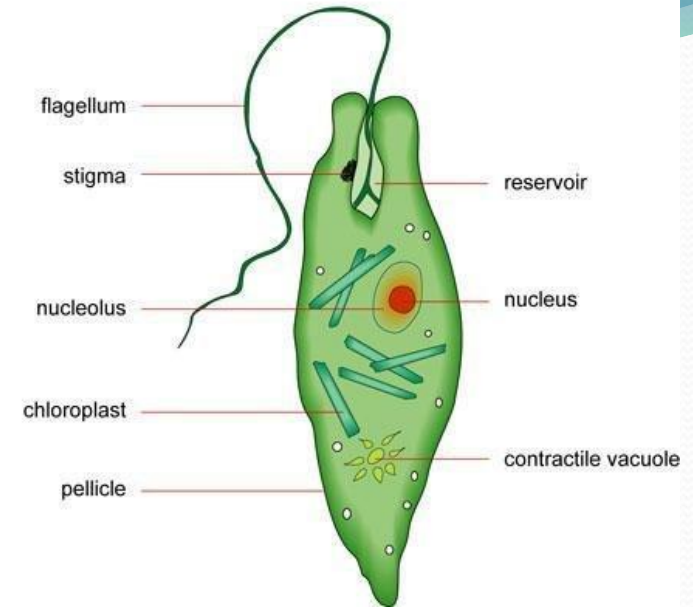
- Characteristics:
  - Unicellular, most are motile.
  - Contain chlorophyll for photosynthesis.
  - 3 phyla closely related to algae
  - 1 phyla closely related to fungi
  - Reproduce asexually via binary fission



# Phylum Euglenophyta

- Flagellates with chloroplasts
- Most common is the Euglena.
  - 2 flagella in front end, larger one propels the cell forward.
  - Can also change shape and crawl, called euglenoid movement. (they have a special membrane and associated structures called a pellicle).
  - Red eyespot (primitive eye): helps to locate brightest areas.
  - More light= more energy.
  - Phototrophic autotrophs normally.
  - In absence of light they become saprophytic heterotrophs.

STRUCTURE OF A EUGLENA

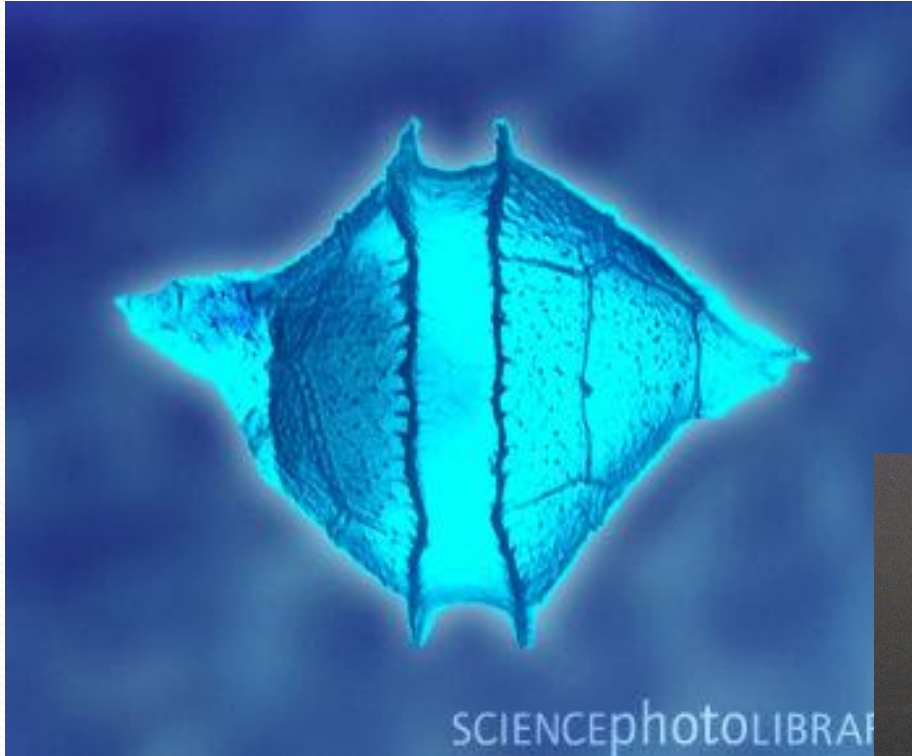


# Phylum Pyrrophyta: Fire Protists

- Also called Dinoflagellates
- Mostly photosynthetic, some are heterotrophs
- Two flagella (one wraps like a belt around the middle, other one trails behind like a tail).
- Covered by two thick plates like armor.
- When agitated give off bioluminescence – organic light.
- Blooms cause Red Tide.



# Bioluminescence



# Phylum Chrysophyta “golden plants”

- Diatoms are the most well known.
- Reproduce sexually
- Some have flagella
- Most solitary, some colonize
- Some can live within the cell walls of glass
- 2000 species belong in the group Diatoms
- Cell walls are rich in silicon
- Shaped like a petri dish, one side fits snugly into the other.
- Etched with a design, most abundant species in the ocean.



# Harmful Relationships of Plant-like Protists

- Blooms
  - Euglenophytes- are able to increase in number rapidly, causing too much waste, depleting food sources they begin to die and add to the waste in the lake.
  - Causes the water to turn green in ponds/ lakes, cutting off the sunlight to marine plants.
  - Dinoflagellates – cause Red Tide.
    - Toxin causes paralysis when infected shellfish are eaten.

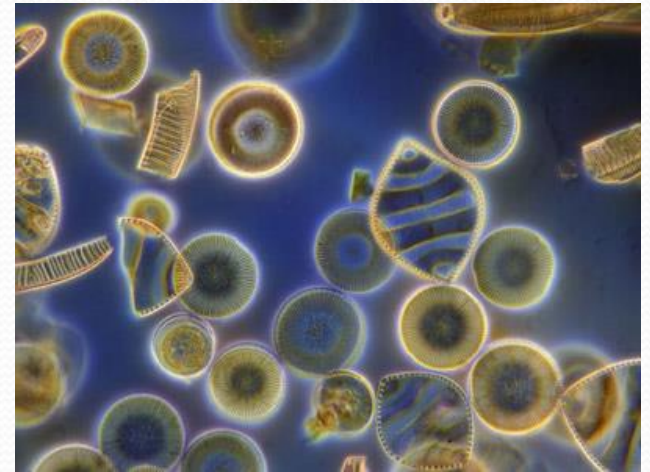
## Helpful Relationships of Plant-like Protists

- Symbiotic relationships
  - Coral + Dinoflagellates = Dino's get coral waste and coral get **photosynthesis** products from the Dino's.
  - Food Chain- **70**% of the earth's **photosynthesis** occurs on or near the ocean's surface.



## Helpful Relationships of Plant-like Protists

- Diatoms and manufacturing
  - A new method of producing paint has been developed by Andrew Parker, professor of biology, and his team at Green College at Oxford University in England.
  - This new method uses a much greener way to create iridescent pigments. This could be used for paint, cosmetics, and even holographic plastic.



# Fungi-Like Protists

- Phylum Acrasiomycota
- Phylum Myxomycota



## Phylum Slime Molds – Fungal like protists

- At one stage, they appear as amoeba-like cells, at another, they produce mold-like masses that give rise to spores.



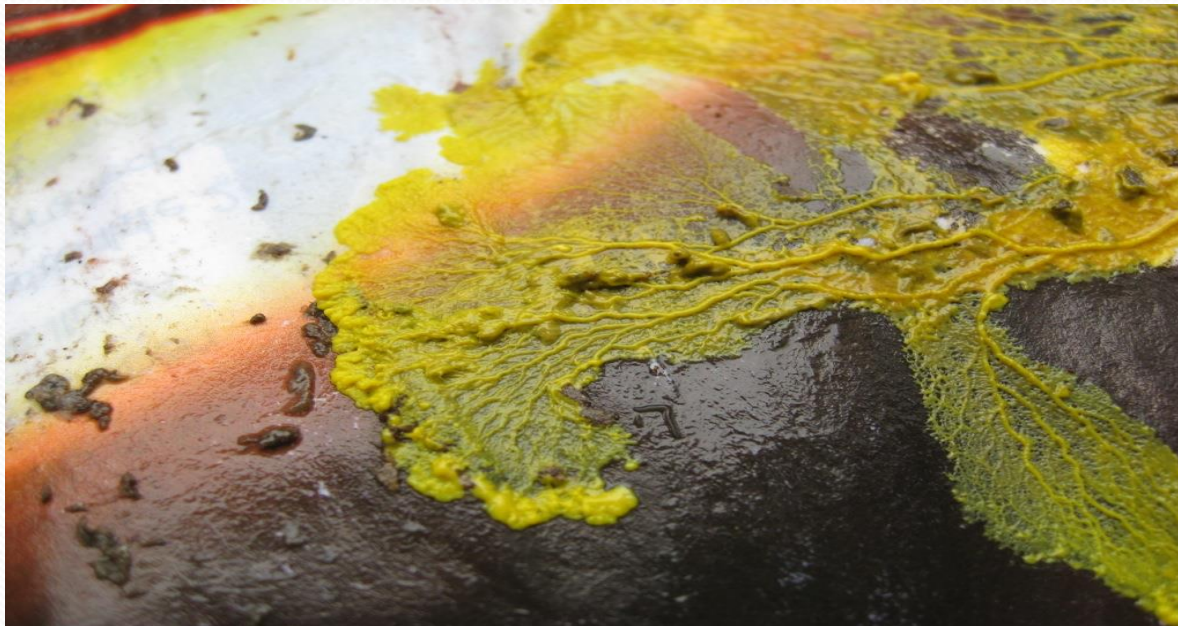
## Phylum Acrasiomycota :Cellular Slime Molds

- Spend most of their lives as free living amoeba-like cells.
- When food is scarce, cells clump together and act as a single organism.
- Masses of cells may migrate several centimeters.
- Produce a reproductive structure called a fruiting body (fungi term) that makes spores.
- Spores give rise to new amoeboid cells, cycle starts over again when the conditions are suitable.



## Phylum Myxomycota: Acellular Slime Molds

- Begins life as an amoeboid cell.
- Later, produces a plasmodia which contains 1000's of nuclei enclosed in a single cell membrane. Nuclei are free to move throughout the entire structure.
- Produces fruiting bodies whose spores germinate into flagellated cells, that later produce the amoeboid cells.



# Homeostasis in Protists

- How do protists obtain their energy?
  - Protists can either be autotrophic or heterotrophic
  - **Autotrophic** Phytoplankton – these protists obtain their energy through photosynthesis.
  - **Heterotopic** Zooplankton - most of these are free living and can be parasitic
    - **Predators** – prey on other protists.
    - **Scavengers** – feed on dead organisms or the waste of organisms

# Homeostasis in Protists

- How do protists release energy?
  - Most protists are **aerobes**, that means that they respire. Some protists can live without **oxygen**, but only for short periods of time.
  - The ability for protists to survive without **complex** systems is related to their **body** size.
  - Protists require a higher **surface area** to **volume** ratio in order to exchange  $O_2$  directly with the environment.
  - This limiting factor ensures that **protists** don't get very large.

# Roles of Protists

- Protists may be producers, consumers or decomposers.
- Almost all protists serve as food for other organisms.
- Some protists can be parasitic to livestock, dogs, cats and humans.
- They cause dysentery, African sleeping sickness, malaria, and other diseases.

# The Response to stimuli:

- **Tropism** – movement in response to a stimulus.
- Protists can **react** to tropisms in a negative or positive manner.
  - **Negative** Tropisms: areas of low oxygen, high temperature, and towards other objects that are NOT food.
  - **Positive** Tropisms: Food, certain chemicals and light
- Another tropism is call **Avoidance** Response

# Important Terminology

- Paramecium can fire its **trichocysts** (“harpoon”) to immobilize prey or to defend from predators.
- Some protists have a **contractile vacuole** which is used to expel excess **water** when it contracts.