

# Groups of Protists

**Section 21-2**

# Grouping Protists

- **Key Idea:** Grouping protists by the way they **obtain nutrients** helps us understand their ecological

# Grouping Protists

- One group includes protists that, like plants, get energy by photosynthesis.
- One group includes protists that, like animals, capture and eat other organisms.
- One group includes protists that, like fungi, absorb nutrients from their environment.

# Animal-Like Protists

**Key Idea:** Animal-like protists **ingest** other organisms to **obtain energy**.

A **pseudopodium** is an extension of the protist cells.

The word variety means

# Animal-Like Protists

- Animal-like protists are often called *protozoa*, which means “first animals.”
- All animal-like protists are unicellular, most can move, and most reproduce asexually by binary fission.

# Amoeboid Protists

- Amoeboid protists include a wide variety of organisms that move by using pseudopodia.
- Pseudopodia are also used to surround and engulf food particles.
- Amoebas live in fresh water, in salt water, and in soil.
- Most amoebas are free-living, but some are parasites.

# Amoeba



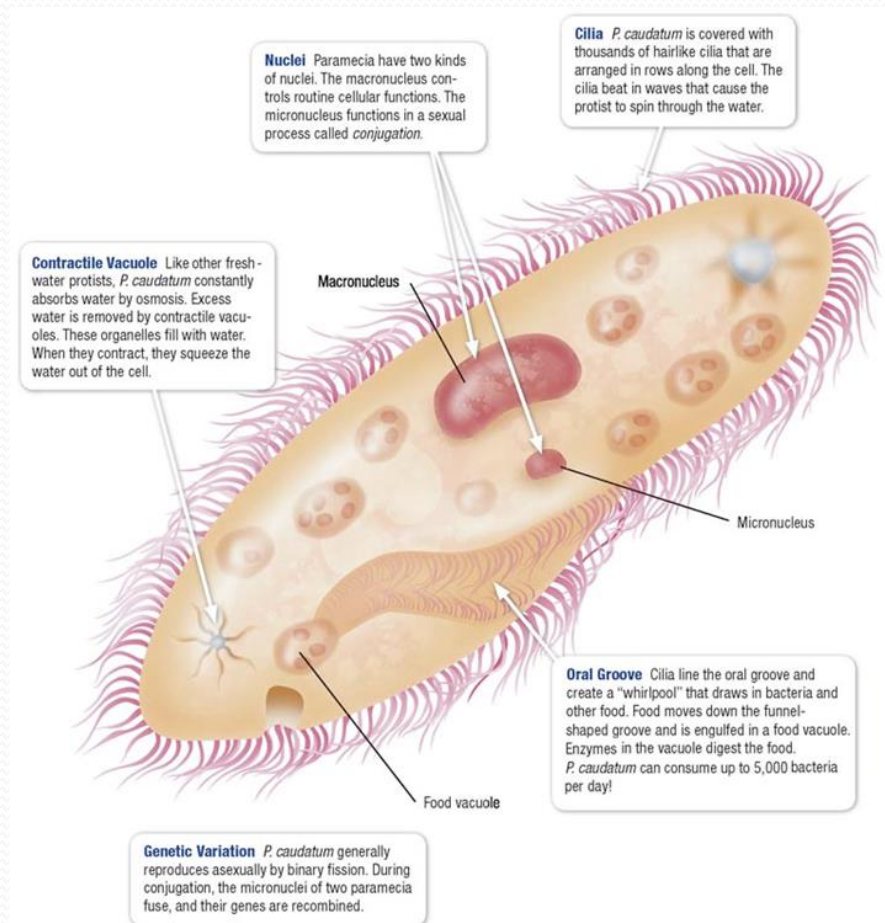
- Some amoeboid protists form outer shells called *tests* made of protein, calcium carbonate, silica, or mineral particles.
- Pseudopodia extend through holes in the tests to help amoebas move and catch prey.

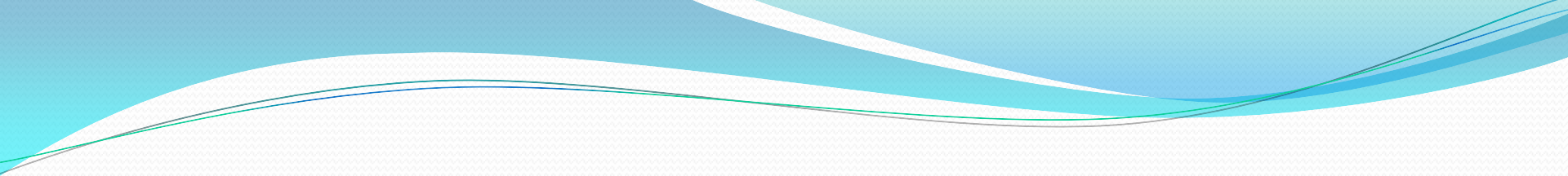


# Ciliates

- The ciliates include some of the most complex single celled organisms.
- Most or all of the body of a ciliate is covered by a tough yet flexible outer covering and short, hairlike structures called *cilia*.
- Ciliates move and hunt for food by beating their cilia.

# Paramecium



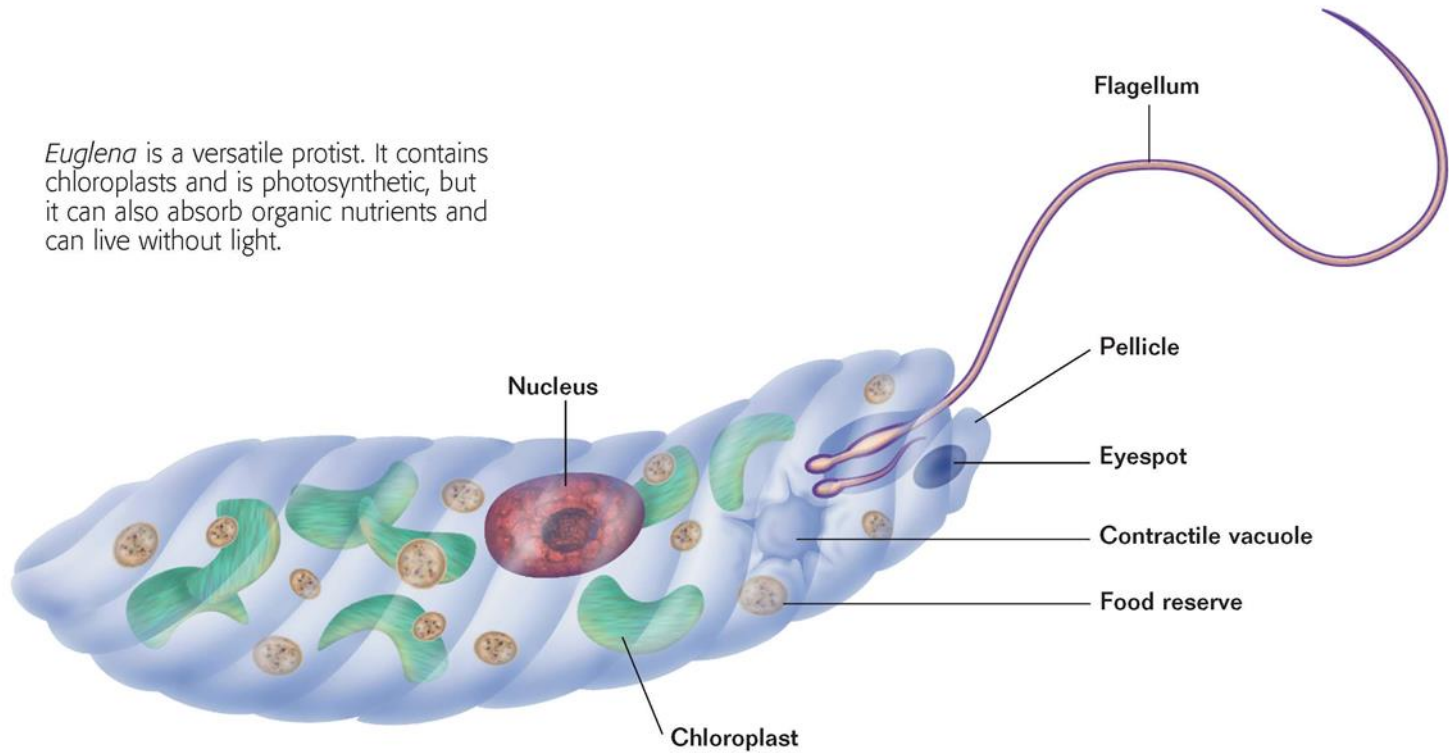
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- Most ciliates are free-living and can be found in fresh water and salt water.
  - Ciliates reproduce sexually by conjugation, in which two cells join temporarily and exchange one of their small nuclei with each other.

# Flagellates

- Flagellates are protists that have whip-like structures called *flagella*.
- Some have one flagellum, while others have many.
- Many flagellates are free-living while some are parasites.

# Euglena

*Euglena* is a versatile protist. It contains chloroplasts and is photosynthetic, but it can also absorb organic nutrients and can live without light.



# Sporozoans

- Animal-like protists that form sporelike cells when they reproduce are called sporozoans.
- They lack flagella, cilia, and pseudopodia and thus do not move.
- All sporozoans are parasitic and cause disease.
- Sporozoans reproduce both asexually and sexually

# Plantlike Protists

**Key Idea:** Plantlike protists obtain energy through **photosynthesis**.

- Plantlike protists include the organisms commonly called *phytoplankton* and *algae*.

# Diatoms

- Diatoms are photosynthetic, unicellular protists with unique double shells.
- Their shells are made of silica or calcium carbonate and have a distinct patterns.
- Diatom shells are like small boxes with lids.
- Individuals are diploid and usually reproduce asexually.
- When they reach a certain minimum size, they reproduce sexually and produces full-sized offspring.



# Diatoms



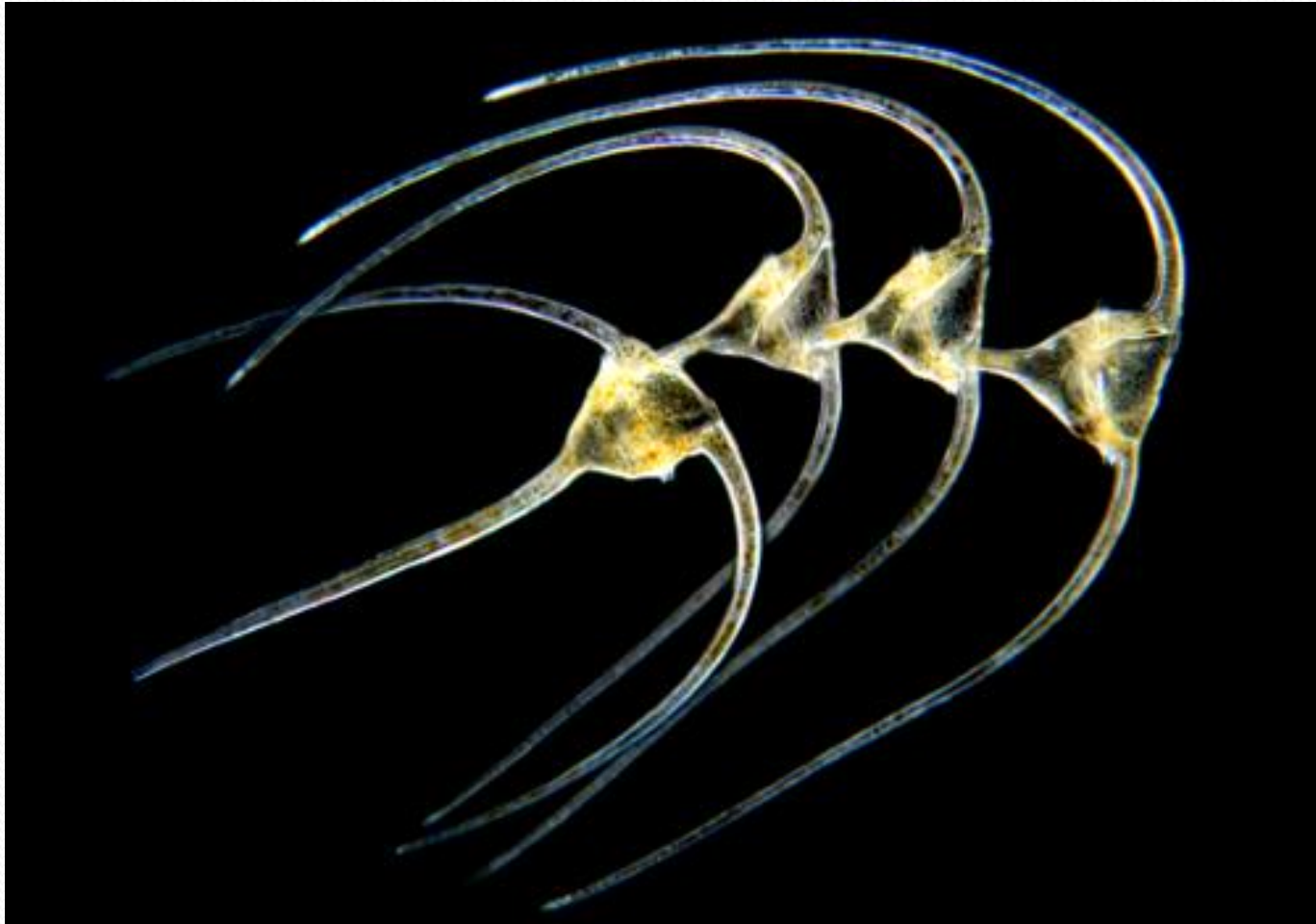
# Euglenoids

- Euglenoids are freshwater protists that have one or two flagella.
- Many euglenoids are photosynthetic.
- Some are both photosynthetic and heterotrophic. Others lack chloroplasts and ingest their food.
- Some have an eyespot, a light-sensitive organ that helps them move toward light.

# Dinoflagellates

- Dinoflagellates are unicellular protists that typically have two flagella.
- Most dinoflagellates are photosynthetic, but some are heterotrophic.
- Most dinoflagellates have protective coats that may contain silica.
- The silica coats give dinoflagellates unusual shapes.

# Dinoflagellates



# Red Algae

- Most red algae are multicellular. They are usually found in warm ocean waters.
- Some red algae have calcium carbonate in their cell walls.
- These coralline red algae play an important role in the formation of coral reefs.

# Red Algae



# Brown Algae

- Brown algae are multicellular protists that are found in cool ocean environments.
- The largest brown algae are kelp that can reach 60 m (197 ft) in length.
- Blades often have air-filled sacs that help the algae float close to the surface of the ocean.

# Brown Algae





# Green Algae

- Green algae use chlorophyll for photosynthesis.
- Green algae are thought to have given rise to the first true plants.

# Green Algae



# Funguslike Protists

**Key Idea:** Funguslike protists absorb **nutrients** from their environment and reproduce by **releasing spores**.

- A **plasmodium** is a mass of cytoplasm that has many nuclei.

# Slime Molds

- Slime molds form spores and absorb nutrients from soil, decaying wood, or animal dung.
- Cellular slime molds usually exist as single-celled amoebas.
- Plasmodial slime molds divide into many small mounds and produces spores.

# Water Molds and Downy Mildews

- Water molds and downy mildews decompose dead organisms and are common parasites of aquarium fish.
- In 1846, one type of water mold destroyed almost the entire potato crop in Ireland, which led to the Great Famine.
- In 1879, a downy mildew of grapes almost wiped out the French wine industry.

# Water Molds and Downy Mildews



*Hyphomycetes* (Fungi) (Kasahara, 1951) (Kasahara, 1951)

