

**Topic: The Diversity of Protists**

**Reading: Chapter 20**

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**Main concepts:**

- Kingdom Protista was originally intended to contain all the one-celled Eukaryotes. However, several hard-to-place multicellular groups have been added to this kingdom. Because it is a polyphyletic group (represents multiple evolutionary lineages), this kingdom may be broken up in the future.
- Among the organisms currently classified as protists, we can see a wide range of nutrition (autotrophs, heterotrophs, decomposers), and a wide range of reproductive methods (sexual and asexual). Reproduction and “sex” (gene exchange) are not necessarily the same process in protists.
- Among the enormous diversity in this kingdom are these interesting groups:
  - Diplomonads, which have two nuclei, include the parasite *Giardia*, which causes severe intestinal problems in people who accidentally consume it in their water.
  - Parabasalids are a group that includes both parasites and mutualistic symbionts. Termites have parabasalids in their gut, which help them digest wood. The sexually transmitted disease trichomoniasis is caused by *Trichomonas vaginalis*, a parabasalid.
  - Euglenozoans include the protist *Euglena*, an organism that defied early taxonomists working under the old two kingdom system (animals and plants). *Euglena* is photosynthetic like a plant, motile like an animal, and can also feed like a decomposer.
  - Kinetoplastids include the trypanosomes, parasitic protists that cause sleeping sickness in humans.
  - Water molds, now classified as protists instead of fungi, caused the great potato famine in Ireland in the mid 19th century.
  - Diatoms are common planktonic organisms with beautiful and diverse silica shells.
  - Brown algae are common seaweeds, including the enormous bull kelp. Most brown algae are multicellular.
  - Dinoflagellates have a whip-like flagella that causes them to whirl. Some dinoflagellates have a red pigment, and if they reproduce in huge numbers, can cause toxic red tides.
  - *Plasmodium* is a parasitic protist that causes malaria.
  - Ciliates include the familiar *Paramecium*. They are common freshwater organisms.
  - Foraminifera have calcium carbonate shells. Extinct foraminifera are among the most common fossils in the world.
  - Amoebozoans include the familiar Amoeba, a formless protist that moves by means of extensions called pseudopods.
  - Slime molds, once grouped with the fungi, are now included in the protists. These are common forest organisms with multiple life stages that can include independent amoeba-like single cells that may come together into a moving slug-like organism.
  - Red algae often have calcium carbonate in their cells and form coral-like structures. Some are softer and more gelatinous. Agar, a gel used in making bacterial cultures, comes from red algae.
  - Green algae have many similarities to plants, including the same photosynthetic pigments and cell walls made of cellulose. Some systems group them with the plant kingdom. Green algae include the colonial alga *Volvox* and the filamentous algae *Spirogyra*.

**Common misconceptions:**

- Students often believe all one-celled organisms are “primitive,” and lump protists with prokaryotes. Protists are structurally more complex than prokaryotes. They have organelles and contain their DNA in a nucleus.

**Reading notes:**

- Describe the different modes of nutrition seen among the protists.
  - Describe various means of reproduction seen in the protists.
  - Biologists say that sex and reproduction are uncoupled in most protists. What does this mean?
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# Notes

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- Make a table that includes each of the groups of protists listed above in the “main concepts” section. List the characteristics of each group. Be sure to include: nutrition (autotrophic, heterotrophic, etc.), ecological roles (parasitic, independent, mutualistic, etc.), and a representative organism from each group.

## Useful websites:

- “Cells Alive!” <http://www.cellsalive.com/index.htm> is a good site for reviewing basic cell structures.
  - “Protista Movies” [http://biog-101-104.bio.cornell.edu/BioG101\\_104/tutorials/protista.html](http://biog-101-104.bio.cornell.edu/BioG101_104/tutorials/protista.html) has small QuickTime movies of live protists.
  - “Protist Movie Database” <http://protist.i.hosei.ac.jp/Movies/htmls/indexE.html> also has lots of QuickTime movies of protists.
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