

Diversity of Life 1

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10.6 Protists

Eukaryotes that are not plants, animals, or fungi are lumped together in a group called **Protists**. This group includes autotrophs, heterotrophs, and even species that use both strategies to obtain nutrition. Protists may be single-celled or multicellular. Certain protists, the slime molds, are actually somewhere between single-celled and multicellular—they go from one condition to the other during the course of their lives. Many protists reproduce asexually, but others use sexual reproduction. Because Protists currently includes many separate lineages, some biologists are in the process of splitting it into separate groups.

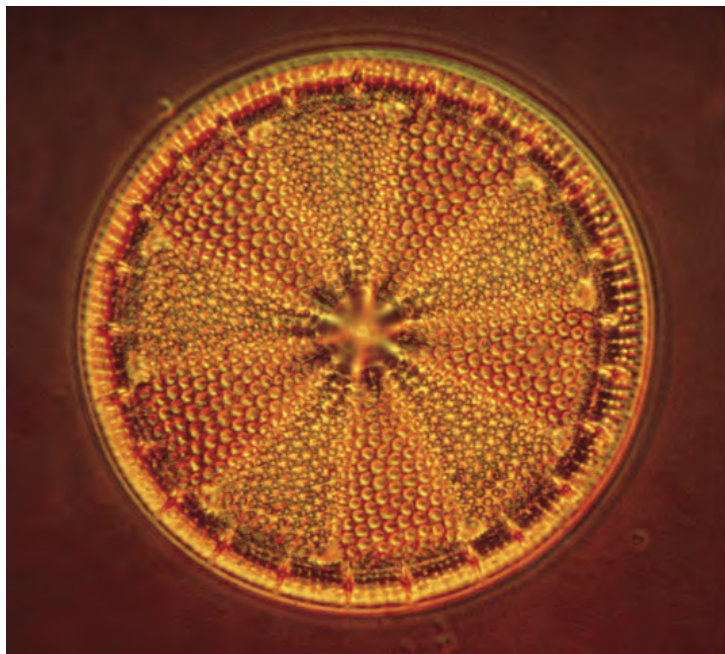


FIGURE 10.7

This microscopic view of a diatom shows its silica shell.

Many protists are autotrophs that get their food from photosynthesis. *Diatoms* are single-celled protists that float in the open ocean. They perform most oceanic photosynthesis and are a critical part of many marine food chains. Diatoms have elaborate shells made of silica (Figure 10.7).

These shells are sometimes used in human-made products—for example, they provide the gritty texture of some toothpastes. *Dinoflagellates* are another group of single-celled marine protists. Some dinoflagellates are autotrophs, and others are heterotrophs.

When sunlight and nutrients are plentiful, dinoflagellate populations can explode, producing “red tides.” The discoloration that gives red tides their name is caused by the huge number of dinoflagellates in the water. Red tides aren’t always red, though. The water may be pink, purple, green, orange, brown, or blue, depending on the dinoflagellate that is responsible. Some red tides are toxic; shellfish that eat the dinoflagellates become contaminated and poisonous to humans.



Some photosynthetic protists are multicellular and can grow quite large. For example, all the different kinds of seaweeds are protists. Kelp forms huge oceanic forests that are home to many unique species (Figure 10.8). Red algae are the source of some of the seaweed we eat, including Japanese nori. Green algae are a group of multicellular protists that likely gave rise to terrestrial plants.

FIGURE 10.8

Kelp forms marine “forests” that are home to diverse species. This kelp forest is off the West Coast of the United States.

Heterotrophic protists are typically active, single-celled hunters with special cell vacuoles for digesting prey. *Amoebas* move by extending part of their body forward and then pulling the rest of the body behind (Figure 10.9). The extensions are called pseudopodia (“false feet”). Amoebas surround and engulf their prey.



Ciliates move by beating numerous hairlike projections called cilia. *Flagellates* move by whipping a single long flagellum. Both ciliates and flagellates have openings that function as “mouths.” One group of flagellates, called the choanoflagellates, probably gave rise to animals.

Protists cause a number of serious human diseases, including malaria, African sleeping sickness, and amoebic dysentery. Malaria is caused by *Plasmodium* protists that divide their life cycle between mosquitoes and humans. Humans contract the disease when infected mosquitoes bite them. The protists then move into human red blood cells (Figure 10.10) and reproduce in huge numbers. The synchronized emergence of protists from host red blood cells causes chills, fever, and vomiting.

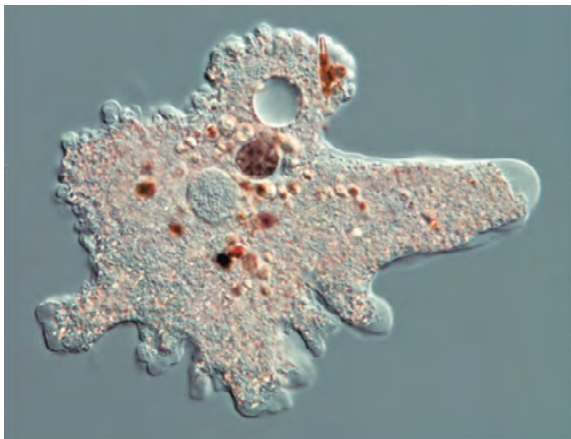


FIGURE 10.9

This freshwater amoeba (left) feeds on bacteria and smaller protists. It uses extensions of its body to move as well as to engulf food.

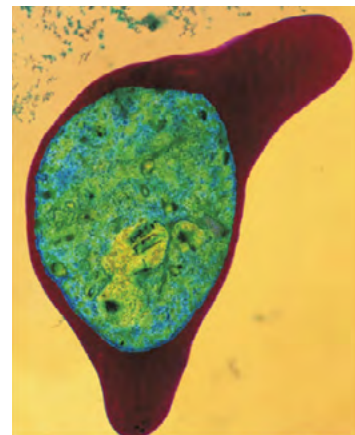


FIGURE 10.10

This misshapen red blood cell has been infected by the malaria-causing protist *Plasmodium* (shown in green on the right).



READING CHECK

Why is the group Protists currently being divided into separate groups?

CHECK YOUR ANSWER

At the moment, the group Protists basically consists of all eukaryotes that aren't plants, fungi, or animals. "Protists" include many separate lineages that are lumped together for no good reason.

You can read more about protists, and see more photos, at this website:

<https://www.livescience.com/54242-protists.html>

