

EXAMINING PROTISTS

BACKGROUND INFORMATION

When Linnaeus first developed his classification system in 1758, the microscope was still a relatively new invention, and the term organism brought to mind something macroscopic. All living things were classified as animals or plants. In time, microscopic studies revealed a unique group of organisms that had some characteristics of both animals and plants. Today these organisms are grouped in kingdom Protista. Protists are the kingdom of unicellular eukaryotic organisms. However, protists are not the only unicellular eukaryotes. Yeasts and some green algae are also unicellular eukaryotes. Also, protists are not strictly unicellular. Some chrysoophytes form threadlike colonies, and cellular slime molds are produced from solitary amoeboid cells that join together and function like a multicellular organism. Other protists have animallike, plantlike, or funguslike characteristics. This diverse group of organisms shows similarities to other kingdoms, but because it is unicellular, it does not fit easily into any of them. In this laboratory exercise, you will examine some of the characteristics of protists that set them apart from other organisms.

PROBLEM

What characteristics of protists can be observed with a microscope?

MATERIALS (per group)

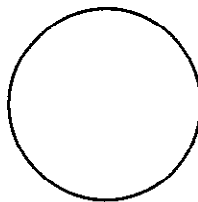
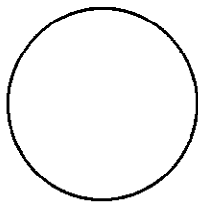
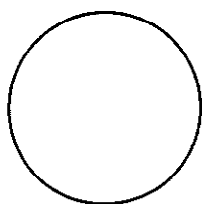
pond water	cotton
coverslips	microscope
microscope slides	protist identification
medicine dropper	guide

PROCEDURE

1. Using the medicine dropper, put a drop of pond water in the center of a clean glass microscope slide.
2. Pull apart a small piece of cotton and put a few threads in the drop of pond water.
Note: Only a few threads are necessary.
3. Cover the drop of pond water with a coverslip. With your microscope set on low power, look for signs of life in the water.
4. When you find microorganisms, switch to medium power and focus with the fine adjustment. Observe what happens when one of the microorganisms bumps into the thread.
5. Try to get a microorganism in the center of the field of view. Switch to high power and focus with the fine adjustment. **Note:** Use only the fine adjustment to focus when using the high-power objective. When using the high-power objective, do not focus downward (do not bring the objective closer to the slide) while looking through the microscope.

6. Draw the protist in the space below. Next to your drawing, write down your observations of the protist's appearance and behavior. Note its shape and color and the organelles that are visible. Try to determine how it moves—a "fluttery" edge on the protist, for example, is a sure sign of cilia.
7. Repeat steps 5 and 6 with as many different protists as you can find.
8. Using a protist identification guide, try to identify the protists in your drawings.

OBSERVATIONS



1. What types of movement did you observe in the protists?

2. What organelles did you observe in the protists?

3. Describe what protists do when they bump into an obstacle such as a thread.

4. What characteristics did the protists have in common?

5. How were the protists different from one another?

ANALYSIS AND CONCLUSIONS

1. What important characteristics of protists are difficult or impossible to observe with a light microscope?

2. Why was the cotton put into the drop of pond water? Predict what you might have observed if there were no cotton in the pond water.

3. Was it easy to identify the protists you observed? Explain.

4. Suggest what might be done to make it easier to observe and identify protists.

CRITICAL THINKING AND APPLICATION

1. At one time, living things were classified as animals if they moved or ingested food, and as plants if they did not move or ingest food. What difficulties would arise in trying to classify the protists according to these criteria?

2. How do protists differ from bacteria?

3. The *Euglena*, a photosynthetic protist, has an eyespot which is sensitive to light. What is the purpose of this adaptation for the *Euglena*? How could you use this adaptation to help collect *Euglena* and similar photosynthetic protists?

4. Some protists live in colonies of many cells. How are these colonial protists different from multicellular organisms?

5. Unicellular yeasts are classified as fungi while unicellular green algae are classified as plants. These classifications are based on ancestry. The protist kingdom "is defined by exclusion: its members are neither animals . . . , plants . . . , fungi . . . , nor prokaryotes." How do the organisms above help to illustrate this point?
