

Microorganisms - Protists: Euglena



Euglena are unicellular organisms classified into the Kingdom Protista, and the Phylum Euglenophyta. All euglena have chloroplasts and can make their own food by photosynthesis. They are not completely autotrophic though, euglena can also absorb food from their environment. Euglena usually live in quiet ponds or puddles.

Euglena move by a **flagellum** (plural flagella), which is a long whip-like structure that acts like a little motor. The flagellum is located on the anterior (front) end, and twirls in such a way as to pull the cell through the water. It is attached at an inward pocket called the **reservoir**.

Color and label the reservoir grey.

Color and label the flagellum black.

The Euglena is unique in that it is both heterotrophic (must consume food) and autotrophic (can make its own food). **Chloroplasts** within the euglena trap sunlight that is used for photosynthesis and can be seen as several rod-like structures throughout the cell.

Color and label the chloroplasts green.

Euglena also have an eyespot at the anterior end that detects light, it can be seen near the reservoir. This helps the euglena find bright areas to gather sunlight to make their food.

Color and label the eyespot red.

Euglena can also gain nutrients by absorbing them across their cell membrane, hence they become heterotrophic when light is not available, and they cannot photosynthesize.

The euglena has a stiff **pellicle** outside the cell membrane that helps it keep its shape, though the pellicle is somewhat flexible, and some euglena can be observed scrunching up and moving in an inchworm type fashion.

Color and label the pellicle blue.

In the center of the cell is the nucleus, which contains the cell's DNA and controls the cell's activities. The nucleolus, which makes ribosomes, can be seen within the nucleus.

Color and label the nucleus purple.

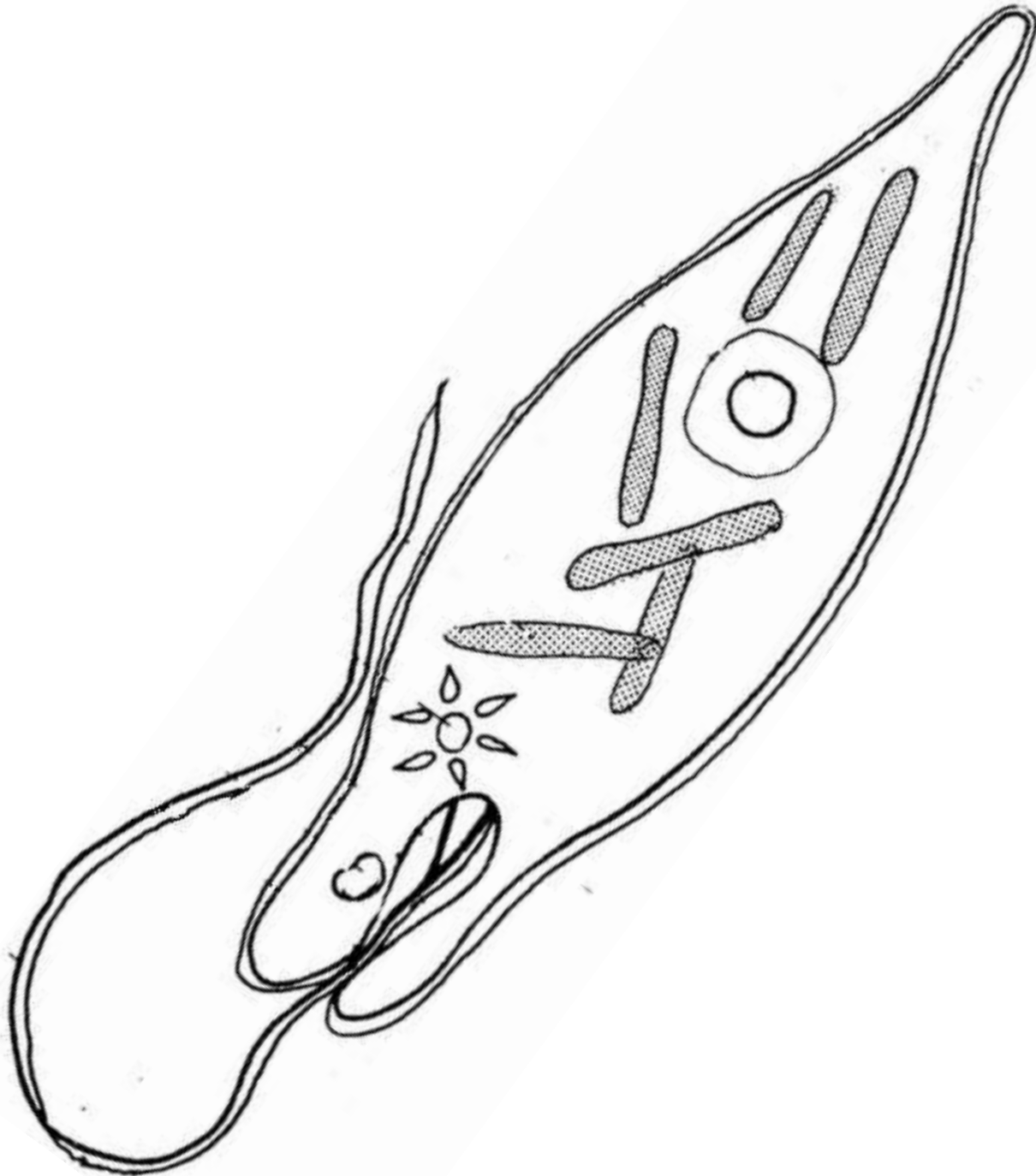
Color and label the nucleolus pink.

The interior of the cell contains a jelly-like fluid substance called cytoplasm.

Color and label the cytoplasm light yellow.

Toward the posterior of the cell is a star-like structure, the **contractile vacuole**. This organelle helps the cell remove excess water, and without it the euglena could take in some much water due to osmosis that the cell would explode or **lyse**.

Color and label the contractile vacuole orange.



Microorganisms - Protists: Spirogyra



In almost every ditch with reasonably clean water we can find slimy masses of filamentous algae called **Spirogyra**, floating as scum on the surface. It looks rather distasteful, but a ditch like that is not polluted, only eutrophic (rich in nutrients).

Spirogyra owes its name to a **chloroplast** (the green part of the cell) that is wound into a spiral, this is a unique property of this genus (type of protist) which makes it easy to recognize.

Color the long spiral chloroplast (A) green.



Spirogyra is called a filamentous algae because it consists of long filaments of many cells. You can see the **cell walls** between each individual cell.

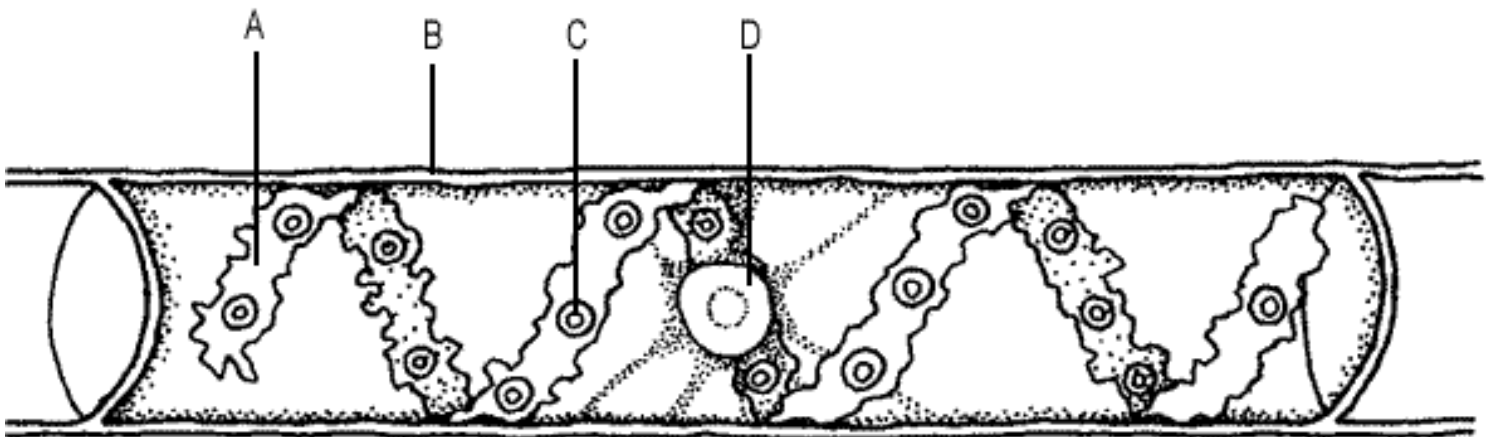
Color the cell wall (B) pink.

The small round bodies in the chloroplast are pyrenoids, which are centers for the production of starch.

Color the pyrenoids (C) red.

In the middle of the cell we can see the transparent nucleus.

Color the nucleus (D) blue.



Questions:

1. Are euglena unicellular or multicellular?
2. What Kingdom do euglena belong to? What Phylum?
3. What organelle carries out photosynthesis?
4. Is the flagella located at the anterior or posterior end?
5. Define autotrophic.
6. Define heterotrophic.
7. When a euglena becomes heterotrophic, how does it obtain nutrients?
8. What helps the euglena keep its shape?
9. What is the eyespot used for?
10. What is the function of the nucleus?
11. What is the function of the nucleolus?
12. What is the function of the contractile vacuole?
13. What would happen if the cell did not have the contractile vacuole?
12. What do the pyrenoids do?
13. Where might you find spirogyra?
14. Is the spirogyra unicellular or multicellular?