**Unicellular Organisms**

Unicellular organisms perform the same life processes as multicellular organisms. Individually, these cells can only be seen using a microscope. For this reason, unicellular organisms are often called “micro-organisms.” Even when found in large groups, such as bacterial colonies, each cell displays all of the characteristics of a living thing. Unicellular organisms include bacteria and some protists and fungi.

**Nutrition**

Many unicellular organisms live in bodies of water and must move around to find food. Most often, they must obtain nutrients by eating other organisms. Plant-like protists, and some types of bacteria, can make their own food through photosynthesis. Other micro-organisms, such as fungi and bacteria, interact with one another to obtain nutrients.

**Paramecia**

Paramecia are unicellular organisms that are found in aquatic environments. These animal-like protists feed on bacteria and algae. Paramecia are covered with cilia that beat in unison, creating water currents that move the paramecium toward a food source. The oral groove of the paramecium also contains cilia that create currents that draw the food into a cavity. Once this cavity is filled, the food is enclosed in a vacuole where it is slowly digested. As the food vacuole travels through the cell, nutrients diffuse through the vacuole’s membrane into the cytoplasm. Any remaining waste materials are eliminated through an anal pore.



Cilia

Oral groove

Food Vacuole

Anal Pore

**Amoeba**

The amoeba is another animal-like protist that must move about to find food. The amoeba uses phagocytosis to feed on organisms. The pseudopods extend around the food material and form a food vacuole. The vacuole acts as a site of both storage and digestion. When the amoeba needs nutrients, chemicals are released into the vacuole to break down the stored food. The food particles are then able to diffuse into the cytoplasm of the cell. Once digestion is complete, wastes are released out of the cell by exocytosis.



Extended pseudopod

pseudopod

Food particlee

Food vacuole

Most organisms also need oxygen to survive. The chemical reactions that allow organisms to obtain energy from food use oxygen and release carbon dioxide as a waste product. This means that there must be a steady exchange of oxygen and carbon dioxide into and out of the cell. In unicellular organisms, oxygen diffuses across the cell membrane into the cell. Carbon dioxide diffuses out of the cell once the concentration of carbon dioxide is higher inside the cell than it is outside of the cell. Some micro-organisms, including some bacteria and fungi, can survive without oxygen. Yeast is a unicellular fungus that can survive without oxygen.

**Responding to the Environment**

Humans are able to detect changes in the environment using the five senses (hearing, sight, smell, taste, and feeling). Unicellular organisms do not have this ability. They must sense their surroundings in other ways. Some bacteria can detect chemicals, such as sugar, in their environment and move toward them. Photosynthetic protists, like *Euglena*, can detect light using special sensors. All organisms are able to sense their environment in some way and respond to it.

**Movement and Locomotion**

Unicellular organisms sometimes move toward or away from things in their environment. This includes food, light, and predators. Unicellular organisms can move in two distinct ways—movement and locomotion. **Movement** enables an organism to change its form or shape. This is achieved using pseudopods. Protists, such as the amoeba, use pseudopods to obtain nutrients or to get rid of wastes. Some cells in multicellular organisms, such as white blood cells, use pseudopods to engulf invading organisms by phagocytosis. **Locomotion** enables an organism to change its position in the environment. Unicellular organisms achieve locomotion using cilia and flagella. By creating currents in the surrounding environment, cilia and flagella can move the cell in one direction or another. Unicellular organisms generally live in watery fluids, so they depend on cilia, flagella, and pseudopods for survival.