

The Life Processes of Unicellular Eukaryotes in Pond Water



Vocabulary

Aerobic Respiration—The process by which cells convert glucose and oxygen into energy (in the form of ATP), carbon dioxide, and water. It takes place in the mitochondria of eukaryotic cells and is the most efficient form of energy production.

Asexual Reproduction—A form of reproduction involving a single parent that produces offspring genetically identical to itself.

Binary Fission—A form of asexual reproduction in which a single organism divides into two genetically identical cells.

Cell Membrane—A semi-permeable membrane that surrounds the cell, controlling what enters and exits the cell, while providing structural support and protection.

Chloroplasts—Organelles found in plant cells and some protists that carry out photosynthesis, converting light energy into chemical energy (glucose) using chlorophyll.

Cilia—Short, hair-like structures covering the surface of some cells (such as *Paramecium*) that move in coordinated waves to aid in locomotion and feeding.

Conjugation—A process where genetic material is transferred between two compatible cells through direct contact.

Contractile Vacuole—A specialized organelle found in some unicellular organisms that helps regulate water balance by expelling excess water from the cell, preventing it from bursting.

Cytoplasm—The jelly-like substance inside a cell that surrounds the organelles and supports various cellular processes. It includes both the ectoplasm and endoplasm.

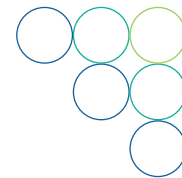
Cytoproct (Anal Pore)—A specialized structure in some unicellular organisms that functions as an excretory opening, allowing waste materials to be expelled from the cell.

Cytostome (Mouth)—The cell mouth or feeding structure in certain unicellular organisms, where food particles are ingested.

Diffusion—The movement of molecules or particles from an area of higher concentration to an area of lower concentration, leading to an even distribution.

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Ectoplasm—The outer, gel-like layer of the cytoplasm in some cells, especially in unicellular eukaryotes, like amoebas. It is often involved in movement and interaction with the environment.

Endoplasm—The inner, more fluid part of the cytoplasm that contains organelles and is responsible for most cellular activities, including metabolism and transport of materials.

Eukaryote—An organism whose cells contain a nucleus and membrane-bound organelles.

Eukaryotic Cells—Cells that *have* a nucleus and other membrane-bound organelles (animals, plants, fungi, and protists).

Excretion—The biological process by which organisms eliminate metabolic waste products from their bodies to maintain internal chemical balance and prevent damage to the organism.

Flagellum—A long, whip-like structure used for movement in some cells, such as *Euglena*. It rotates to propel the cell through its environment.

Food Chain—A linear sequence that shows how energy and nutrients flow from one organism to another in an ecosystem.

Food Vacuole—A membrane-bound organelle that stores and digests food particles engulfed by the cell, allowing for nutrient absorption.

Food Web—A complex network of interconnected food chains illustrating how different organisms are connected through feeding and nutrition.

Food—A substance that provides energy and nutrients to organisms for growth, maintenance, and survival. It can be produced through photosynthesis or obtained by consuming other organisms.

Homeostasis—The process that living organisms use to maintain stable internal conditions, such as temperature, despite external changes.

Macronucleus—A larger nucleus found in some protists (such as paramecium) that controls everyday cellular functions, including metabolism and gene expression.

Micronucleus—A smaller nucleus present in some protists that is mainly involved in genetic recombination, sexual reproduction, and the transmission of genetic material during cell division.

Microorganism—A microscopic living organism that can be unicellular or multicellular.

Mitochondria—This is the “powerhouse” of the cell. Its main function is to produce energy in the form of adenosine triphosphate (ATP). Mitochondria play a crucial role in supporting metabolism, movement, and overall survival.

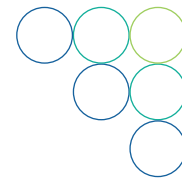
Mitosis—A type of cell division resulting in two daughter cells, each genetically identical to the parent cell.

Nuclei—The plural form of “nucleus,” multiple nuclei within a single cell or across multiple cells.

Nucleolus—A dense, spherical structure found inside the nucleus that is responsible for producing ribosomes, which are essential for protein synthesis.

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Nucleus—The “control center” of a cell that contains genetic material (DNA) and regulates cell growth, reproduction, and function. The nucleus interprets information and issues orders to keep things running smoothly.

Organelle—Specialized structure within a cell that has a specific function. Examples are nucleus, chloroplasts, and pellicles.

Osmosis—The movement of water molecules across a selectively permeable membrane from a region of lower concentration to higher concentration, aiming to achieve equilibrium.

Paraflagellar Body (Photoreceptor)—A structure that works with the flagellum and the stigma to help the cell sense and respond to light by telling the flagellum to move toward the light.

Pellicle—A flexible, protective outer covering found in some unicellular eukaryotes (such as *Euglena* and *Paramecium*) that provides structural support and helps maintain the cell’s shape while allowing flexibility.

Photosynthesis—The process by which light energy is converted into chemical energy, using sunlight, water, and carbon dioxide to produce glucose and oxygen.

Polysaccharides—Complex carbohydrates composed of long chains of sugar molecules, used for energy storage.

Prokaryotic Cells—Cells that *lack* a nucleus and other membrane-bound organelles (Bacteria and Archaea).

Pseudopod—A temporary, foot-like extension of the cytoplasm in some unicellular organisms (such as amoebas) used for movement and engulfing food.

Respiration—The process by which organisms exchange gases with their environment, primarily involving the intake of oxygen and the release of carbon dioxide.

Sexual Reproduction—A reproductive process that involves the fusion of sex cells from two parents, which results in offspring with genetic variation.

Stigma (Eyespot)—A light-sensitive organelle found in *Euglena* that helps the organism detect and respond to light for optimal photosynthesis.

Unicellular—An organism consisting of a single cell that carries out all necessary life functions.

Vestibule (Oral Groove)—A depression or funnel-like structure on the surface of some protists (such as *Paramecium*) that directs food particles toward the cytostome for ingestion.