

MICROSCOPE SLIDES - FACT SHEETS

PARAMECIUM

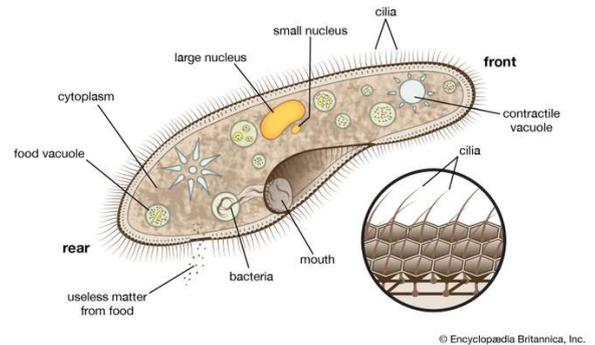
ROLE

Paramecium usually feed on micro-organisms such as bacteria, algae as well as yeast. The **paramecium** is an importance ecological factor within the environment as it helps to clean up small particles of debris in the water as well as being a food source for other small animals.

STRUCTURE AND FUNCTION

1. Cilia

- Cilia are microscopic, hair-like structures that project from the surface of many eukaryotic cells.
- They Cilia are uniform in length, are arranged in longitudinal rows which cover the whole body.
- On the cell surface, motile cilia are present in large numbers where they beat in a coordinated wavelike manner to perform their functions effectively.
- In microscopic organisms (known as ciliates) motile cilia are used for locomotion or for moving fluid over their surface.
- The beating of the cilia helps direct food particles to the oral groove and mouth.
- Some cilia allow cells to sense changes in their surroundings which in turn allows the cells to respond appropriately.
- Propelling cells - using cilia or flagella, cells are able to move freely in their environment, especially in aquatic or moist environments.
- A *Paramecium* propels itself by whiplash movements of the cilia, which are arranged in tightly spaced rows around the outside of the body. The beat of each cilium has two phases: a fast "effective stroke", during which the cilium is relatively stiff, followed by a slow "recovery stroke", during which the cilium curls loosely to one side and sweeps forward in a counter-clockwise fashion.
- The *Paramecium* spirals through the water as it progresses. When it happens to encounter an obstacle, the "effective stroke" of its cilia is reversed and the organism swims backward for a brief time, before resuming its forward progress

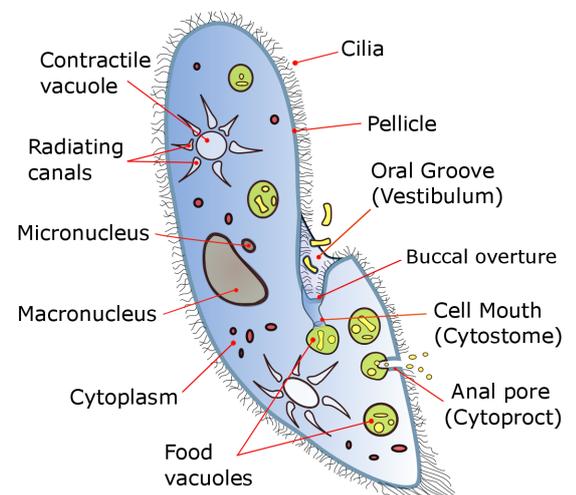


2. The Cell Membrane

- Also called the plasma membrane.
- Maintains the shape of a cell.
- Separates one animal cell from the next.
- Regulates the passage of materials into and out of the cell.
- Made mostly of lipids and proteins.

3. The Oral Groove

- **Oral Groove** - collects and directs food into the Paramecium's cell mouth
- To gather food, the *Paramecium* makes movements with cilia to sweep prey organisms, along with some water, through the oral groove (vestibulum, or vestibule), and into the cell.
- The food passes from the cilia-lined oral groove into a narrower structure known as the buccal cavity (gullet). From there, food particles pass through a small opening called the cytostome, or cell mouth, and move into the interior of the cell.



ELODEA

ROLE

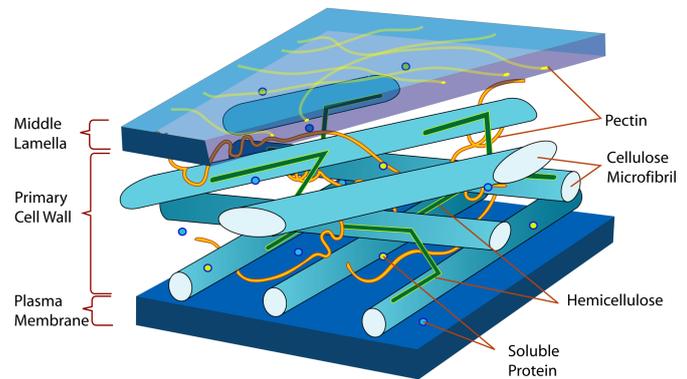
Ecological Importance. Elodea provides habitat for many small aquatic animals (macroinvertebrates), which fish and wildlife eat. Geese, ducks, and swans are particularly attracted to this plant. Elodea is an excellent oxygen producer and is frequently used by fish to protect their young.



STRUCTURE AND FUNCTION

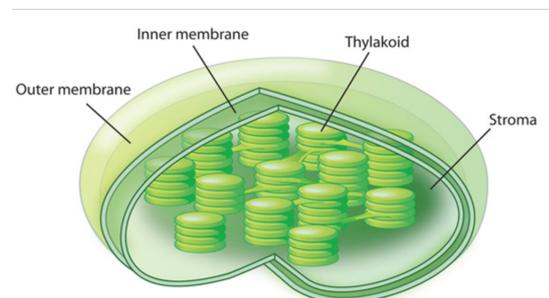
1. CELL WALL

- The cell wall is an outer protective membrane in many cells including plants, fungi, algae, and bacteria. Animal cells do not have a cell wall.
- The main functions of the cell wall are to provide structure, support, and protection for the cell.
- The plant cell wall is multi-layered and consists of up to three sections. From the outermost layer of the cell wall, these layers are identified as the middle lamella, primary cell wall, and secondary cell wall.
- In plants, the cell wall is composed mainly of strong carbohydrate fibre- **cellulose**.
- The cell wall controls the direction of cell growth and helps prevent water loss
- The cell wall helps a plant to remain rigid and erect.
- The cell wall limits the size of cells. If they absorb too much water the cell could rupture.



2. CHLOROPLASTS

- Chloroplasts are only found in plant cells and other unicellular organisms that use photosynthesis to make their energy.
- A chloroplast is where photosynthesis takes place.
- A chloroplast is similar to a solar power plant.
- Chloroplasts absorb the energy from the sun and convert it to the chemical energy of a molecule of glucose or sugar.
- Chloroplasts are surrounded by an outer and an inner membrane.
- Inside the chloroplast are large stacks of other membranes called thylakoids. These thylakoids contain the green pigment chlorophyll which is required for photosynthesis.



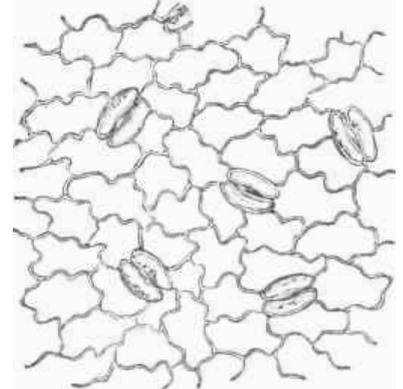
3. CENTRAL VACUOLE

- A central vacuole is a very large vacuole (sac) found in mature plant cells.
- When filled with water, it creates turgor pressure to give strength and support to the cell. This allows the plant to support heavy structures such as flowers and leaves.
- It can also serve as a storage area for organic compounds

RHUBARB EPIDERMAL TISSUE

ROLE

Epidermal cells include several types of cells that make up the epidermal tissue of plants. Although they serve a number of important functions, their primary role is to protect the plant from a variety of harmful factors (environmental stressors) including microbes, chemical compounds as well as ultraviolet light among others. These cells are situated very close together to prevent water loss, another a protective mechanism.

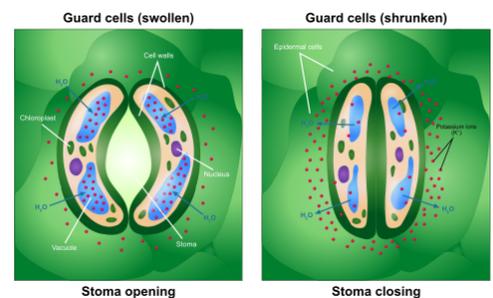


1. Epidermal Cell (Pavement cells)

- Found in the leaves of many dicots (plant in which the seed has two embryonic leaves or cotyledons).
- The shape resembles interlocking jigsaw puzzle pieces which provide some mechanical strength to the leaves.
- Tightly packed together, pavement cells serve to prevent excess water loss.
- They make up a protective layer that protects other more specialized cells located beneath.
- They do not contain Chloroplasts.
- They help maintain the internal temperature
- Keep the inner layers of cells in place
- They provide barriers to various organisms, particles and other substances from the external environment
- Separate the stomata apart (by providing tension on either side of stomata)

2. Stomatal Guard Cells

- Stomata are pores in the plant epidermis that are surrounded by two guard cells, which control the opening and closing of the aperture. These guard cells are in turn surrounded by subsidiary cells which provide a supporting role for the guard cells.
- Stomatal guard cells are part of the epidermal tissue that serves several functions in plants.
- **Guard-cells**, together with the opening between them, constitute the **stomata**.
- guard cells are more specialized than the epidermal cells
- they have a definitive shape that allows them to carry out their important functions.
- Depending on water availability (as well as the concentration of sugars and ions), guard cells can become turgid which controls the closing and opening of the stomata pore.
- The closing and opening of these Stoma (pore) regulate gaseous exchange in and out of the leaves.
- Guard cells also contain chloroplasts that allow for photosynthesis.



3. Nucleus

- The nucleus is the control centre of the cell.
- The nucleus contains nearly all of the cell's DNA. The DNA has the instructions for making proteins and other important molecules.
- The nucleus is surrounded by a nuclear membrane.
- The nuclear membrane is a double membrane that is dotted with thousands of pores. These pores allows materials to move into and out of the nucleus.
- The chromosomes are made of DNA and have two functions: To contain the genetic information that is passed from one generation to the next and to control the cell's activities.

