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Lab 4 - Microscopic observation of plant and animal cells

The main Goal of this lab:

To observe and compare the structure of plant and animal cells under the light microscope.

1- Plant Cells

Plant cells are the basic **structural** and **functional units** of plants. They are generally rectangular in shape and are surrounded by a rigid cell wall composed mainly of **cellulose**, which provides support and protection. Inside the cell, the cell membrane controls the movement of substances in and out of the cell.

Plant cells contain a **large central vacuole** that maintains cell turgidity and stores water, nutrients, and waste materials. They also possess **chloroplasts**, which are specialized organelles responsible for photosynthesis, allowing plants to convert light energy into chemical energy. The nucleus contains genetic material (**DNA**) that controls cellular activities, while the cytoplasm hosts various metabolic processes.

Slide Preparation

- Commonly prepared from onion epidermis or plant leaves
- **Iodine solution** is used to stain the cell wall and nucleus

Note: The stain increases contrast, making cellular structures easier to observe.

Commonly Observed Plant Cells

1 .**Epidermal Cells**

- Form the outer protective layer of plants
- Commonly observed in onion epidermis slides

2 .**Parenchyma Cells**

- Living cells with thin cell walls
- Involved in storage and photosynthesis

3 .**Xylem Cells**

- Transport water and minerals
- Have thick, lignified cell walls

4 .**Phloem Cells**

- Transport food materials within the plant

2-Animal Cells

Animal cells are the basic units of **structure** and **function** in animals. Unlike plant cells, animal cells do not have a cell wall, which gives them a more irregular or rounded shape. The outer boundary of the cell is the cell membrane, which regulates the exchange of materials between the cell and its environment.

Animal cells contain a nucleus, cytoplasm, and several organelles such as **mitochondria**, which produce energy for cellular activities. They may also contain **lysosomes**, which are involved in intracellular digestion. Animal cells **lack chloroplasts** and large central vacuoles, as they do not perform photosynthesis.

Slide Preparation

•Prepared from human cheek epithelial cells

• **Methylene blue stain** is commonly used

• This stain highlights the nucleus and cytoplasm.

❖ **Q - Why is staining important in the microscopic observation of both plant and animal cells?**

Staining makes cell structures visible and easier to identify in both plant and animal cells.

Commonly Observed animal Cells

1 .**Epithelial Cells**

• Cheek epithelial cells are widely used in teaching laboratories

• Provide protection and lining for body surfaces

2 .**Muscle Cells**

• Specialized for contraction and movement

• Elongated in shape

3 .**Nerve Cells (Neurons)**

• Responsible for transmitting nerve impulses

• Characterized by long extensions

4 .**Red Blood Cells**

• Transport oxygen in the blood

• Lack a nucleus in humans.

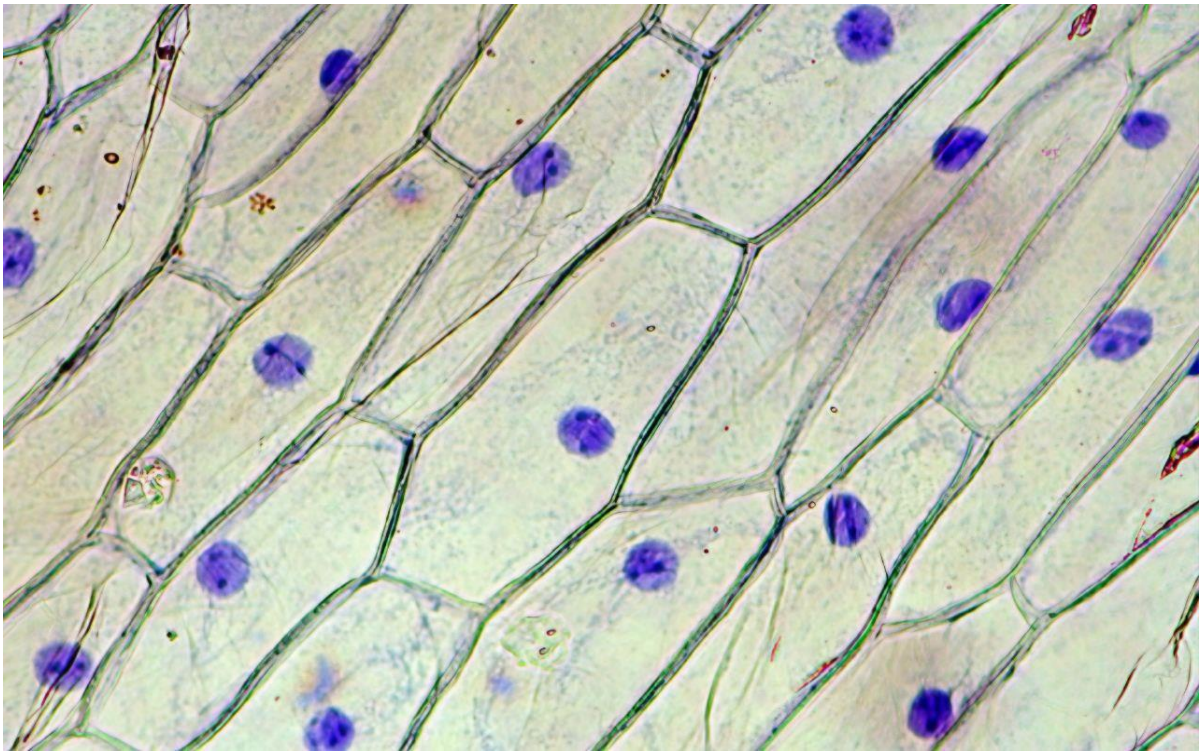
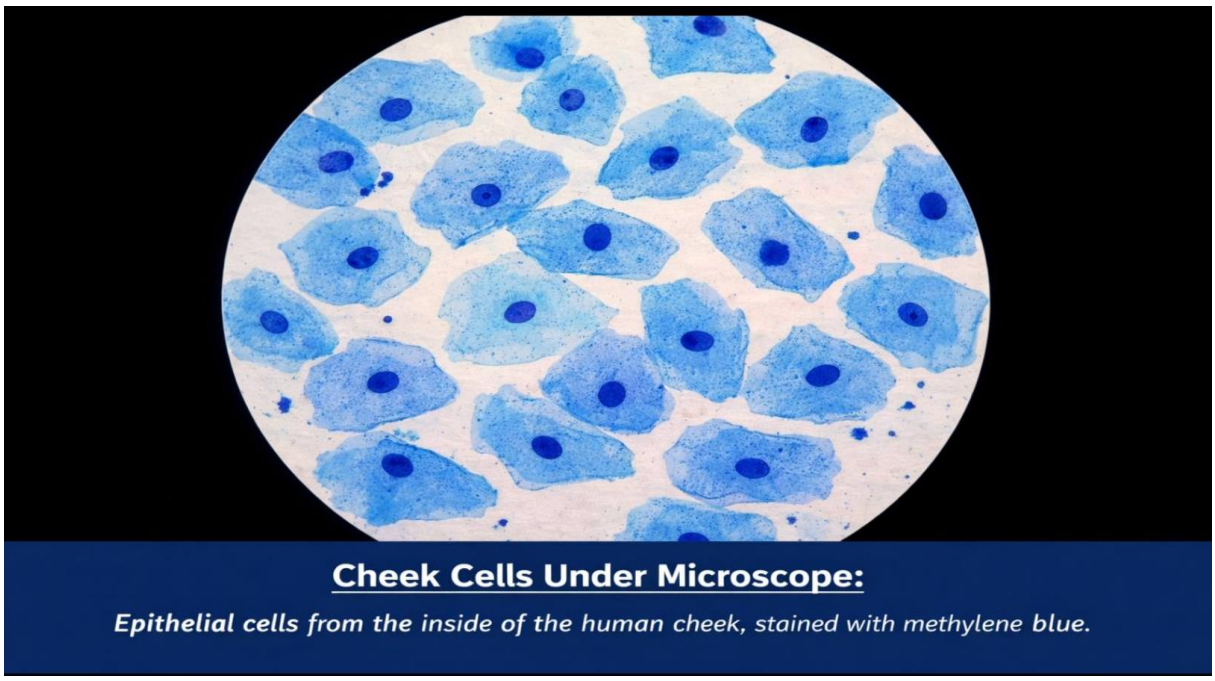


fig 1 **- Onion** Epidermal Cells (Plant Cell)



Comparison Between Plant and Animal Cells

Features	Plant cells	Animal cells
Shape	Usually, regular [rectangular]	Usually irregular or round
Cell wall	Present	Absent
Chloroplasts	Present [photosynthesis]	Absent
Vacuole	Large central vacuole	Small or present
Mode of nutrition	Autotrophic	heterotrophic
centrioles	Usually, absent	Present
Energy source	Photosynthesis and respiration	Respiration only

With Best Wishes