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Lab 5 - Cell Staining and Observation of Organelles

Cell staining is a laboratory technique used to enhance contrast, allowing visualization and differentiation of cellular components. Stains bind selectively to certain cell components based on their chemical properties. Some stains have affinity for acidic structures (such as the nucleus), while others bind to basic or neutral components.

Types of Cell Staining

1 .Simple Staining

Uses a single dye to stain the entire cell. It is mainly used to observe cell shape, size and arrangement.

Examples**: Methylene blue**, **Crystal violet**.

2 .Differential Staining

Uses more than one stain to distinguish between different cellular components or types of cells.

Example**: Gram staining** (commonly used for **bacteria**).

3 .Vital Staining

Stains living cells without killing them, allowing observation of cellular activity.

Example: **Neutral red**.

4 .Supravital Staining

Cells are stained after removal from the organism but while still alive.

Common Stains Used in Cell Biology

- **Methylene Blue**: Stains the nucleus and nucleic acids.
- **Safranin**: Stains cytoplasm and cell walls.
- **Iodine**: Enhances contrast, especially in plant cells.
- **Crystal Violet**: Used for bacterial cells and nuclei.

Organelles Observed Using Light Microscopy

1 .**Nucleus**

- Control Center of the cell
- Contains genetic material (**DNA**)
- Clearly visible after staining

2 .**Cytoplasm**

- Jelly-like substance
- Site of metabolic activities

3 .**Cell Membrane**

- Selectively permeable boundary
- Often difficult to see without staining

4 .**Cell Wall** (Plant Cells)

- Rigid outer layer
- Clearly visible in stained plant cells

5 .**Vacuole** (Plant Cells)

- Large central vacuole
- Stores water and nutrients

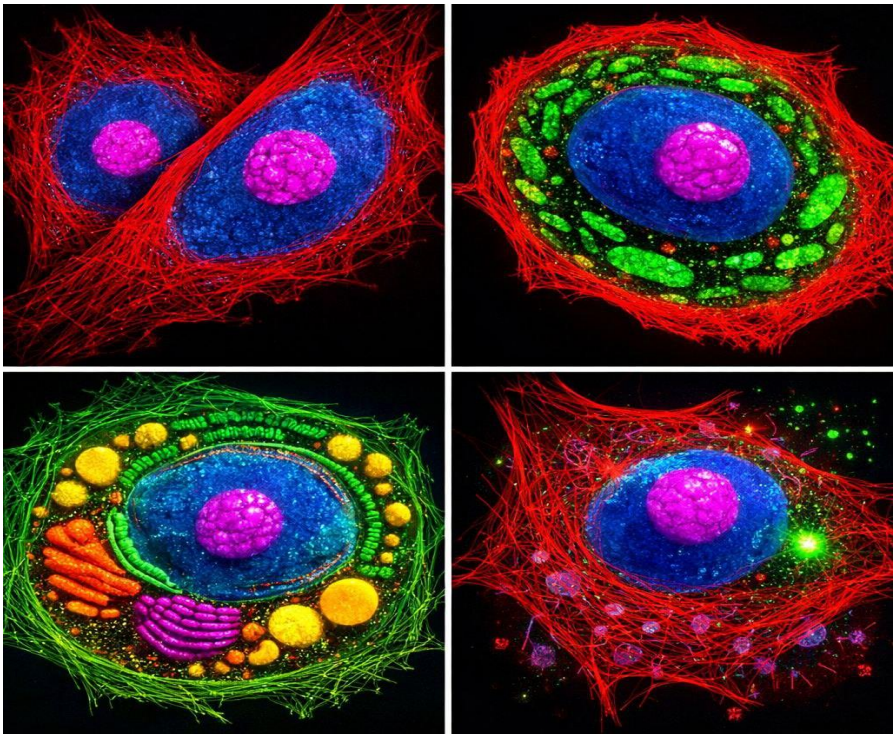

Figure 1

Fluorescently stained eukaryotic cells showing the **nucleus** (blue), **nucleolus** (magenta), **mitochondria** (green) and **cytoskeleton** (red) under a fluorescence microscope.