Title: Preparation of Temporary Stained Squash of Onion Root Tip to Study Various Stages of Mitosis

Objective: To prepare a temporary stained squash of onion root tip cells and observe the various stages of mitosis under a microscope.

Introduction: Mitosis is the process of cell division in which a single cell divides to produce two identical daughter cells. It plays a crucial role in growth, development, and tissue repair. The onion root tip is ideal for studying mitosis as it contains actively dividing cells in the meristematic region. Staining enhances the visibility of chromosomes, allowing clear identification of different mitotic stages.

Materials Required:

1. Fresh onion root tips
2. Hydrochloric acid (HCl, 1N)
3. Aceto-orcein or Acetocarmine stain
4. Distilled water
5. Watch glass
6. Scalpel or razor blade
7. Forceps
8. Glass slides and cover slips
9. Filter paper or blotting paper
10. Compound light microscope

Procedure:

1. **Collection and Preparation of Root Tips:**
    - Take a fresh onion and allow it to grow roots in water for 4–5 days.
    - Cut about 1 cm of the root tips using a scalpel.
2. **Fixation and Hydrolysis:**
    - Place the root tips in a watch glass containing 1N HCl and keep it for 3–5 minutes to soften the tissue.
    - Rinse the root tips with distilled water and blot dry with filter paper.
3. **Staining:**
    - Transfer the root tips onto a clean glass slide.
    - Add a few drops of aceto-orcein or acetocarmine stain.
    - Let the stain act for about 5–10 minutes.
4. **Squashing:**
    - Cover the stained root tip with a cover slip.
    - Gently press the cover slip with the blunt end of a forceps or the back of a pencil to spread the cells into a thin layer.
    - Remove excess stain using filter paper.
5. **Microscopic Observation:**
    - Place the prepared slide on the microscope stage.
    - Start with a low-power objective (10x) to locate the cells.
    - Switch to high power (40x) to observe the different stages of mitosis.

Observations:

- Different stages of mitosis such as **prophase, metaphase, anaphase, and telophase** can be identified.
- Chromosomes are clearly visible due to staining.
- Actively dividing cells are concentrated at the meristematic region of the root tip.

Discussion: The experiment successfully demonstrated the mitotic process in onion root tip cells. Hydrolysis with HCl softened the cell walls, making it easier to spread the cells. Staining helped in differentiating chromosomes at various stages of mitosis. The observed stages confirm the sequential process of nuclear division, ensuring proper genetic material distribution.

Conclusion: The temporary stained squash preparation enabled clear observation of mitotic stages in onion root tip cells. This technique is essential for understanding cell division and its significance in growth and development.

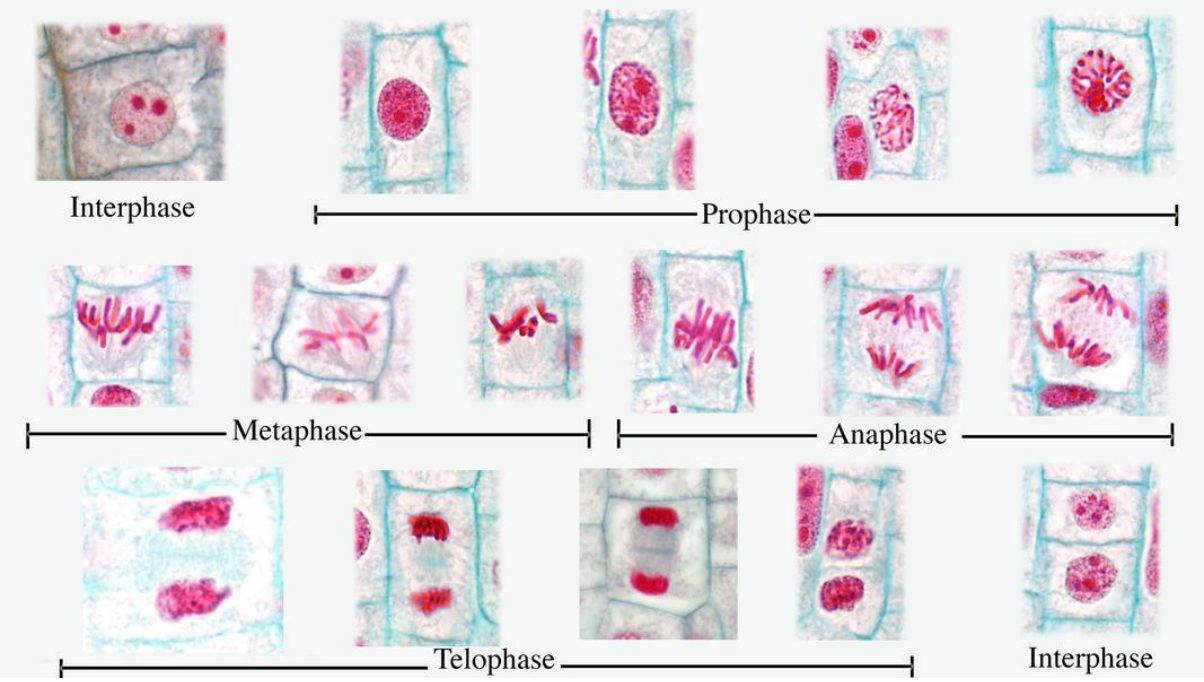

Figure 1: Different stages of mitosis in the onion root tip.