

## Onion root tip for mitosis and mitotic index

Aim - Study of Mitosis by preparing a temporary mount of onion root tip.

Theory → All organisms are made up of cells and growth and maintenance of tissue and formation or regeneration of new cells is very essential for living organisms. According to cell theory all cells come from the pre-existing cells. Continuity of life depends on cell division. Organisms divide by two methods 1. Mitosis 2. meiosis

Mitosis is a very important method of cell division as it helps in growth and development of new cells. Mitosis is a process in which an eukaryotic cell nucleus splits in two followed by division of the cytoplasm thus it is completed in two stages Karyokinesis (Div<sup>n</sup> of nucleus) and cytokinesis (div<sup>n</sup> of cytoplasm)

Mitosis completes in following stages -

- Prophase - 1. thickening and coiling of the chromosomes  
2. Shrinkage of nucleolus and disappearance of nuclear membrane.  
3. Organisation of a group of fibres to form a spindle.

### Metaphase -

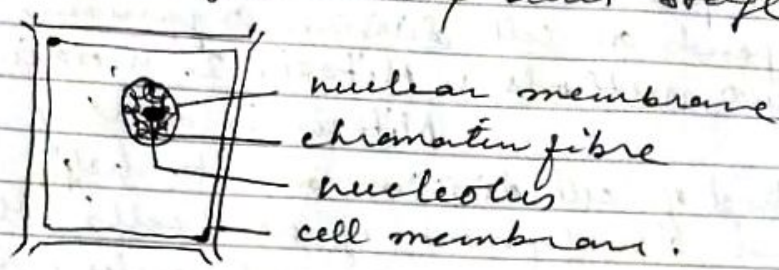
1. chromosome becomes thick and the two chromatids of each chromosome become clear.
2. Each chromosome attaches to spindle fibres at its centromere.
3. chromatemes are arranged at the middle of the cell.

Anaphase - Each chromatid pair separates from the centromere and move towards the opposite ends of the cell by spindle fibres

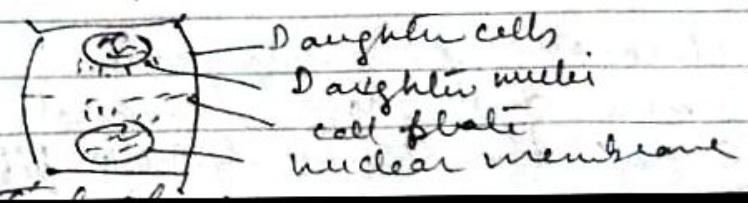
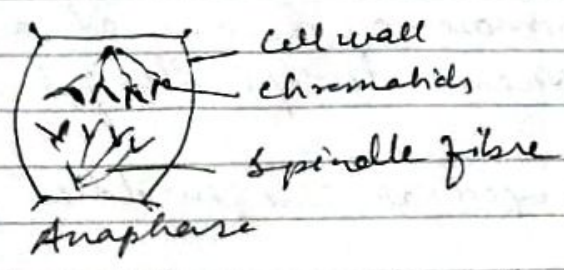
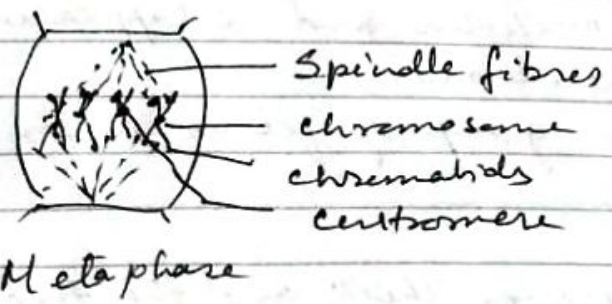
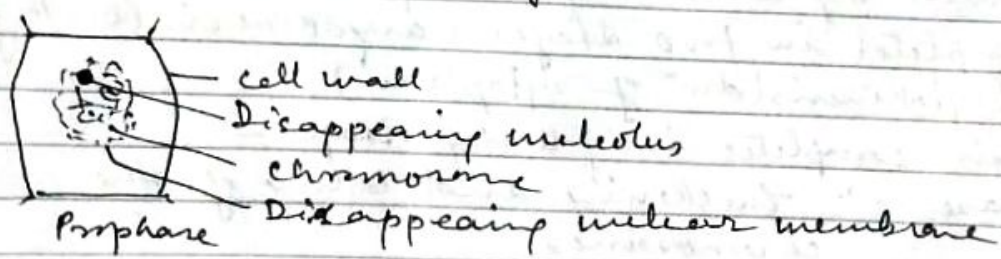
2: The cell membrane begins to pinch at the centre.

Telophase -

- 1. Chromatids arrives at opposite poles of cell.
- 2. Spindle disappears and daughter chromosomes uncoil to become chromatin fibre.
- 3. The nuclear membranes and nucleolus reform and two daughter nuclei appear at opposite poles.
- 4. Cytokinesis or the partitioning of the cell may also begin during this stage.



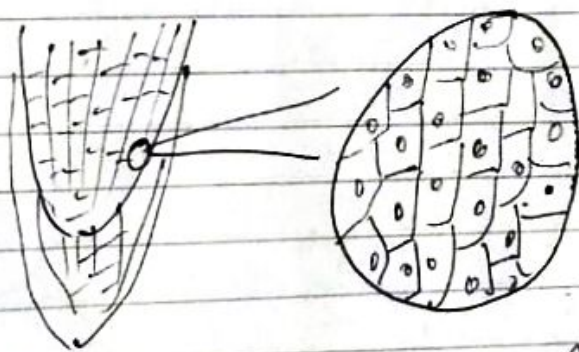
Interphase stage



(3)

The cell undergoes in interphase after mitosis. It is the non dividing phase of the cell cycle between two successive cell divisions. Interphase consists of three stages called  $G_1$ , S and  $G_2$  phase.

Mitosis in Onion root tip - The meristematic cells located in the root tips provide the most suitable material for the study of mitosis. The chromosome of monocotyledonous plants is large and more visible, therefore, onion root tips are used to study mitosis. Based on the kind of cells and species of organisms, the time taken for mitosis may vary. Mitosis is influenced by factors like temperature and time.



Mitosis in Root tip

Learning objectives -

1. To understand the stages of mitosis.
2. To know about the real events in cell division.

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