

Mitotic index

$$\text{Mitotic index} = \frac{P + M + A + T}{\text{Total cells}}$$

- **Introduction:** Cell population growth occurs as cells pass through interphase and mitosis to complete the cell cycle. Many cells lose the capacity to divide as they mature or divide only rarely. Other cells are capable of rapid cell division. For example, as plant roots grow, cells near the tip of the root, in the apical meristem, divide rapidly to push the root through the soil. The root cap detects the pull of gravity and directs the rapid growth of cells near the tip

- One way to quantify cell division is by using the mitotic index:

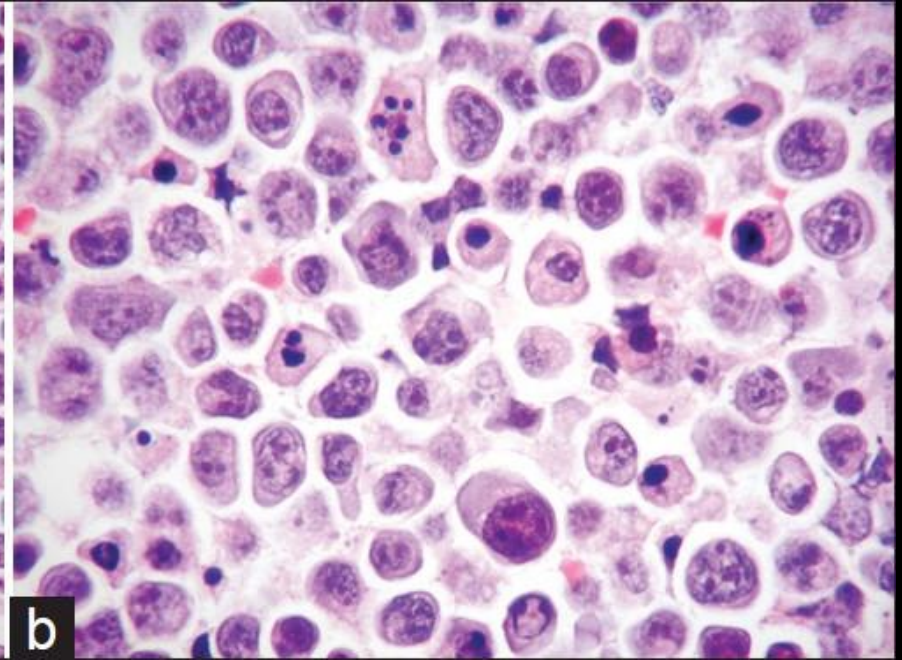
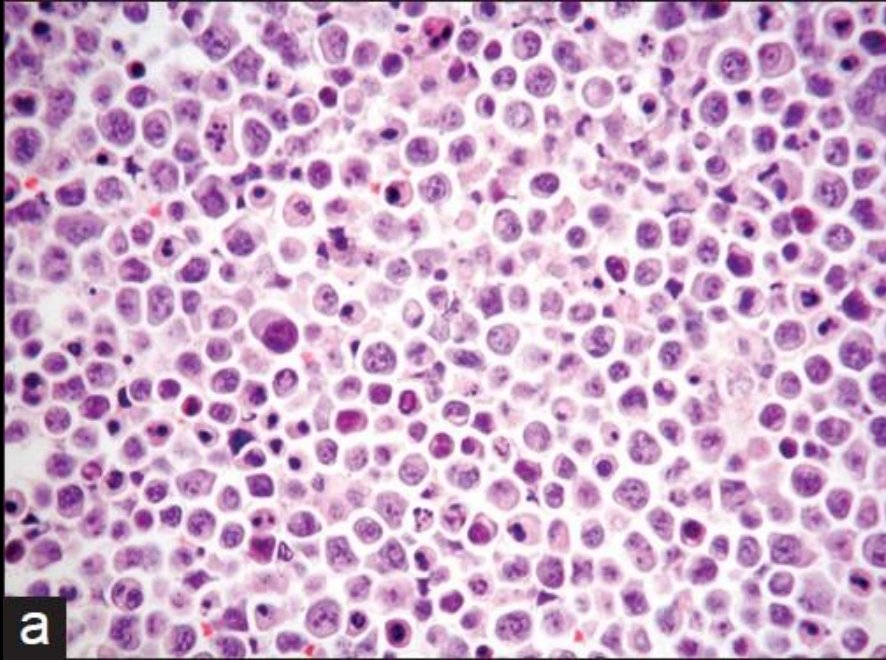
$$\frac{\text{Number of cells in mitosis}}{\text{Total number of cells}} \times 100$$

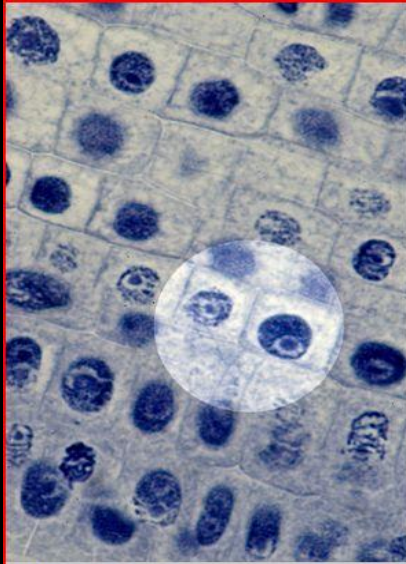
- **Mitotic index = $n/N \times 100$**

$$\text{Mitotic index} = \frac{P + M + A + T}{\text{Total cells}}$$

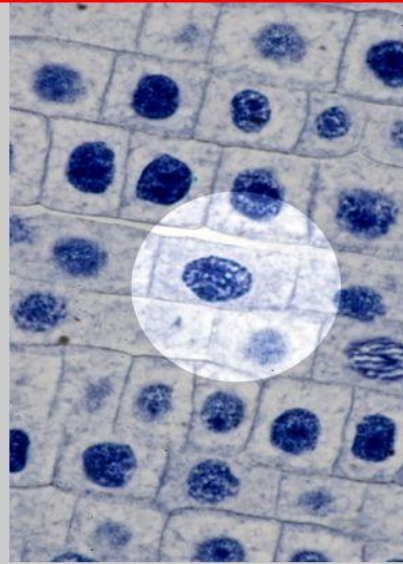
- **Mitotic index** is a measure for the proliferation status of a cell population. It is defined as the ratio between the number of cells in mitosis and the total number of cells.
- The percentage of cells undergoing mitosis or it is defined as the ratio of no. of cells in the dividing phase to the total number of cells observed. This will help to identify the region of most mitotic activities. Mitotic index help us to quantify the cell division. Mitotic index decreases with increasing distance from root tip. That means gradual decrease in cell division as move from the zone of cell division to the zone of cell elongation. The meristematic region in the root tip is the actively growing region and thus the mitotic index is high.

- Each student uses a microscope to analyze the different sections of the onion root tip. The root tip will visually divide. The cells we then counted and classified on the basis of their mitotic stage. Cells not in a mitotic stage will also count. The duration of mitotic stages will then determined using the formula.

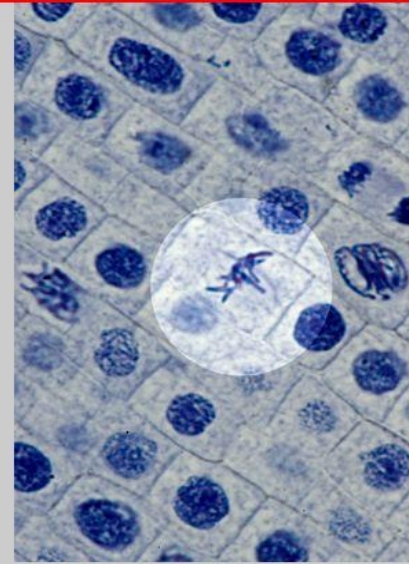




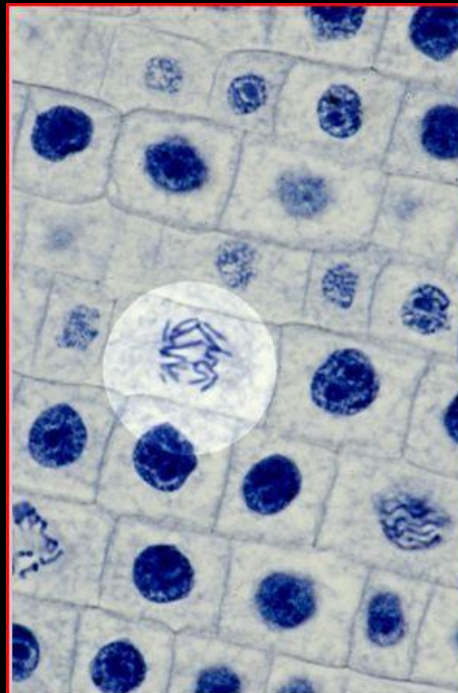
1) Interphase



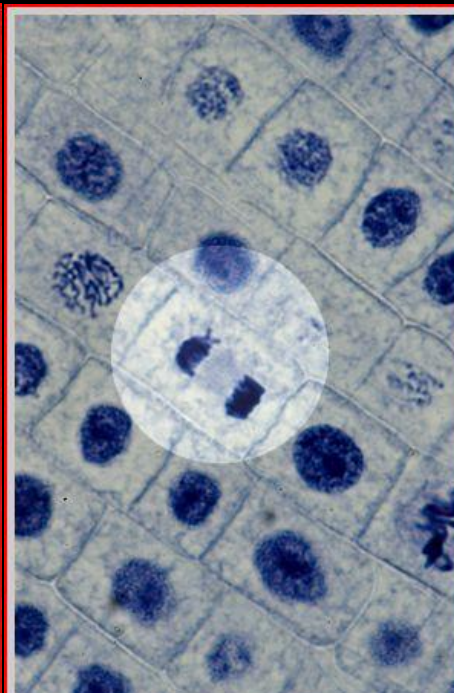
2) Prophase



3) Metaphase



4) Anaphase



5) Telophase

Results

field or level	Dividing cells	Non dividing cells

Level	Number of prophase	Number of metaphase	Number of anaphase	Number of telophase	Number of non deviding cells

$$\text{Mitotic index} = \frac{\text{Number of cells in mitosis}}{\text{Total number of cells}} \times 100$$