

Exp No. 3. Studies on the course of mitosis in wheat, pearl millet-Studies on the course of mitosis in onion and Aloe vera

One of the most important characteristics of all living cells is their power to grow and divide. Cell division is a process by which the cell duplicates itself for growth and reproduction of the organism. It is a complex process by which cellular materials are equally divided between daughter cells. Cell division in plants and animals are of three kinds. They are i) Amitosis ii) Mitosis and iii) Meiosis.

Amitosis: This is also called as direct cell division and is a means of asexual reproduction in unicellular organisms like Bacteria and Protozoa. During amitosis the nucleus elongates first and assumes dumb-bell shape. The constriction in the centre further deepens and divides the nucleus into two. This is followed by the constriction of cytoplasm, which divides the cell into two equal or approximately similar halves. Thus without the occurrence of any nuclear event, two daughter cells are formed.

The best method to study of mitosis is by smear method. The smear method gives a chance to study the chromosomes in a detailed manner. The essential idea underlying in all smear methods is to spread the cells out into a single layer in order that they may be killed instantly and fixed evenly and uniformly without distortion or the production of artifacts.

Onion is a convenient and popular specimen for studying mitosis because the chromosomes are very large, diploid number is relatively very low and cell materials are easily prepared.

Protocol 1. Fix the root tips of onion (5 mm size) in Farmer's solution for 1 to 5 hours. 2. Hydrolyze for 30 minutes in 1 N HCl at 60°C. 3. Wash in 95% ethanol for 30 minutes with at least four changes. 4. Transfer the root tips to a Petri dish containing hematoxylin stain for 20 minutes. 5. Rinse the tips briefly in glacial acetic acid to wash off any excess hematoxylin. 6. Place the root tip on a glass slide and it is overlaid with a small drop of glycerin. 7. A cover slip is placed on the root tip and squash. 8. The cover slip is gently pressed with thumb. 9. The slide is examined under a microscope

Exercise : Identify and draw diagrams to bring out the stages of mitosis in onion.