

The cell cycle and mitosis

The cell cycle

1. Mitosis
 - When a cell divides into two identical cells
2. Gap phase 1
 - Cell grows and new organelles and proteins are made
3. Synthesis
 - Cell replicates its DNA, ready to divide by mitosis
4. Gap phase 2
 - Cell keeps growing and proteins needed for cell division are made

Mitosis

- Needed for growth and repairing damaged tissue
- Some organisms produce asexually using mitosis

Division stages

1. Interphase
 - Cell carries out normal functions but prepare to divide
 - The cell's DNA is unravelled and replicated which doubles its genetic content
 - Organelles are replicated and ATP content is increased
2. Prophase
 - The chromosomes condense getting shorter and fatter
 - Centrioles move to opposite ends of the cell and form a network of protein fibres across it called the spindle
 - The nuclear envelop breaks down and chromosomes are free in the cytoplasm
3. Metaphase
 - Chromosomes line up along the middle of the cell and become attached to the spindle by their centromere
4. Anaphase
 - Centromeres divide, separating the pair of chromatids
 - The spindles contract, pulling chromatids to opposite ends of the cell
5. Telophase
 - Chromatids reach opposite poles on the spindle they uncoil and become long and thin again they are now chromosomes again
 - A nuclear envelop forms around each group of chromosomes so there are now two nuclei
 - The cytoplasm divides and there are now two identical daughter cells
 - Interphase now happens

Observing mitosis

1. Cut the tip from a growing root around 5mm long
2. Put the root tip on a watch glass and add hydrochloric acid
3. Add a few drops of stain so the chromosomes become darker and easier to see under a microscope – toluidine blue, acetic orcein
4. Warm the watch glass by passing it through a Bunsen burner
5. Place the root tip on a microscope slide and using a mounted needle break it open and spread the cells out thinly
6. Add a few more drops of stain and place a cover slip over it
7. Squash the cover slip down
8. Warm the slide again to intensify the stain