Chemical Coordination in Plants

- Plant hormones control some aspects of the growth of plants such as cell division, cell enlargement and cell differentiation.

Phytohormones	Description
1. Auxins	• Promote growth of plants • Secreted by the cells present in the tips of stems and roots • Synthetic auxins are used in horticulture
2. Gibberellins	• Promote cell differentiation in the presence of auxins • Break seed dormancy • Stimulate elongation of shoots
3. Cytokinins	• Promote cell division in plants • Delay ageing of leaves • Promote opening of stomata • Promote fruit growth
4. Abscisic Acid	• Acts as a growth inhibitor • Promotes dormancy in seeds and buds • Promotes closing of stomata • Promotes wilting and falling of leaves • Detachment of flowers and fruits from the plants is due to abscisic acid

Movement Due to Growth

Movement of plant organs towards or away from a stimulus is known as **tropism**.
Since the tropic movements are slow, the stimulus needs to be continued for a longer time for the effects to be noticed.
Different types of tropic movements in plants:

1. Phototropism	• Movement of plant parts towards or away from light is termed phototropism. • Because shoots of most plants grow towards the source of light, it is termed positive phototropism. • Roots grow away from light and hence are negatively phototropic.
2. Geotropism	• Movement of plant organs in response to gravity is termed geotropism. • Roots are positively geotropic because they grow in the direction of gravity. • The shoot grows upwards, i.e. against gravity, and hence is negatively geotropic.
3. Thigmotropism	• Movement of plant organs in response to stimuli caused by physical contact with solid objects is termed thigmotropism. • Weak-stemmed plants use twining stems and tendrils to climb on other plants/objects which provide them support. Hence, twining stems and tendrils are positively thigmotropic.

4. Hydrotropism	• Movement of plant organs in response to water is termed hydrotropism. • Roots grow towards the source of moisture and hence are positively hydrotropic.
5. Chemotropism	• Movement of plant organs in response to a chemical stimulus is called chemotropism. • When plant organs grow away from the chemical response, it is called negative chemotropism. • When plant parts grow towards the chemical response, it is called positive chemotropism. For example, pollen tubes grow towards the sugary substance secreted by the stigma of the flower.
6. Heliotropism	• Diurnal motion or seasonal motion of plant parts in response to the direction of the Sun is termed **heliotropism**. • Sunflowers contain auxins which are sensitive to sunlight. • They stimulate the growth of the cells in the shaded region of the stem so that the flowers end up bending in the opposite direction, i.e. towards the Sun.