

### Control and Coordination

Systematic working of the various organs of an organism (plants or animals) producing a proper response to the stimulus is called co-ordination.

#### Coordination in Plants

Not so elaborate, controlled by phytohormones and external stimulus.

##### Phytohormones

- Control and coordination in plants is done by phytohormones.
- They are naturally occurring chemical substances which control one or other aspect of growth.
- Auxin – Cell enlargement and differentiation.
- Gibberellins – In presence of auxin, promotes cell enlargement and differentiation.
- Cytokinins – Promotes cell division, opening of stomata, etc.
- Abscisic acid – Closing of stomata, wilting and falling of leaves, etc.

##### Tropic Movements

- Directional plant growth movement in response to an external stimulus.
- Growth of a plant may be towards the stimulus (positive tropism) or away from it (negative tropism).
- Phototropism – movement in response to light.
- Chemotropism – in response to chemicals.
- Hydrotropism – in response to water.
- Geotropism – in response to gravity.

##### Nastic Movements

- Non-directional movement of a plant part in response to an external stimulus.
- May or may not be a growth movement.
- All parts of the organ of a plant are affected equally irrespective of the direction of the stimulus.
- Thigmonasty – Nastic movement in response to touch of an object.
- Photonasty – Nastic movement in response to light.

#### Coordination in Animals

Elaborate, very complex and is controlled by neuroendocrine system.

##### Endocrine (chemical) Coordination

- Consists of hormones (chemical messengers) regulating biological processes and secreted by endocrine glands.
- Homeostasis is maintained by hormones by their integrated action and feed back control.

##### Nervous Coordination

- Neuron forms the fundamental unit.
- Sensory neurons in sense organs receive stimulus and transmit impulses to CNS.
- Motor neurons transmit impulses from CNS to effectors.
- Relay or connector neurons serve as links between sensory and motor neurons.

##### Nervous System (Human)

- **CNS** – Consists of brain and spinal cord.
  - **Brain** – Controls various voluntary (walking, riding, running, etc.) and involuntary actions (sneezing, coughing, etc). Also controls thinking, reasoning, and intelligence.
  - **Spinal Cord** – Controls reflex action.
- **PNS** – Consists of cranial nerves (12 pairs) and spinal nerves (31 pairs).
- **ANS** – Two set of nerves (parasympathetic and sympathetic) supplying visceral organs which are antagonistic to each other.