

## MIND MAP

**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.

**Coordination in Animals:** Elaborate, very complex and is controlled by neuroendocrine system.

### **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.

### **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.

### **Nastic Movements**

- Non-directional movement of a plant part in response to 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.

### **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, intelligence.  
**Spinal Cord** – Controls reflex action.
- **PNS** – consists of cranial nerves (12 pairs) and spinal nerves (31 pairs).
- **ANS** – 2 set of nerves (parasympathetic and sympathetic) in visceral organs which are antagonistic to each other.

### **Phytohormones**

- Control and coordination in plants is done by phytohormones.
- They are naturally occurring chemical substances which controls 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.