CONTROL AND CO-ORDINATION

INTRODUCTION AND STRUCTURE OF NEURON

INTRODUCTION

The changes in the environment to which the organisms respond and react are called stimuli. The response of organisms to a stimulus is usually in the form of some movement of their body part.

Co-ordination is the working together of the various organs in a systematic manner so as to produce a proper reaction to the stimulus.

All living organism show sensitivity to changes in the environment.

Stimulus are of two types

External: Stimuli due to environmental factors, e.g. heat, light & water etc.

Internal: It occurs within the organism. It may be due to hormones, acids & enzymes.

- The working of one system is co-ordinated with that of other systems, e.g. During eating our body performs several kinds of co-ordinated activities. The nose differentiates the smell of food and hands serve as the organ of ingestion. The alimentary canal and glands help in the digestion of food. Thus, various organs perform co-ordinated activities.
- Control and co-ordination also help to maintain a steady state of stability and steady state within an organism in constantly changing environment. The mechanism of maintaining internal steady state is called homeostasis.
- The vital activities of an organism are controlled by endocrine system and nervous system.
- There are two types of co-ordinations i.e., nervous and hormonal co-ordination.
- In animals both hormones and neurons (structural and functional unit of nervous system) are involved in regulating and co-ordinating the various vital activities. In plants only chemical (phytohormones) co-ordination is present.

NEURON

The structural and functional unit of nervous system.

Neuron (nerve cell) is the longest cell of human body (up to 100 cm) Neuron is made up of –

(i) Cell body

(ii)Cell processes (axon and dendron)

(i) Cell body: or Cyton or Soma or Perikaryon

It contains granular cytoplasm which is called **neuroplasm**.

Many small fibrils are present in the neuroplasm called **neurofibrils** for the conduction of nerve impulses.

Rough endoplasmic reticulum coils around the ribosome and form a granule like structure called as **Nissl's granule** or **Tigroid body**.

Nissl's granule is the centre of protein synthesis.

Energy for conduction of nerve impulses is provided by numerous mitochondria.

Except centriole, all other cell organelles are found in neuroplasm.



(ii) Cell process :-

(a) Axon :-

- > It is longest cell process of cyton, its diameter is uniform and it contains **axoplasm**.
- > Axoplasm of axon contains only neurofibrils and mitochondria.
- Nissl's granules are absent.
- Axon is covered by **axolemma**.
- Q Axolemma may be covered by a layer of phospholipids which is called as **medulla** or **myelin sheath**.
 - > Myelin sheath acts as insulator and prevents leakage of ions.
 - Myelin sheath is discontinuous around the axon. These interruptions where axon is uncovered by myelin sheath are called **nodes of Ranvier**.

- > Axon produces centrifugal conduction i.e. nerve impulse travels away from the cell body.
- > The terminal ends of axon are branched which are called **telodendria**.
- > Each telodendron ends in a swollen knob called **synaptic knob**.
- Nerve fibres in which myelin sheath is present, are called **medullated** or **myelinated nerve** fibres and nerve fibres without myelin sheath, are called **non-medullated** or **non-myelinated nerve fibres**.

Axon is functional part of nerve cell, therefore term "nerve fibre" usually refer to axon.

(b) Dendron:-

- > It is small cell process.
- It's fine branches are called 'dendrites'
- > Dendron receive the stimuli and produce **centripetal conduction** i.e.
- > nerve impulse travels towards the cell body.
- > It is not covered by myelin sheath.

Differences between medullated and non-medullated nerve fibre.

S.No.	Features	Medullated nerve fibre	Non-medullated nerve fibre
1	Occurrence	White matter	Grey matter
2	Sheath	Two: inner medullary, outer neurilemma	Only neurilemma
3	Node of Ranvier	Present	Absent
4	Speed of nerve impulse	Faster	Slower

Type of Neurons System



