

Control and Coordination

Working together of different body parts/organ in order to perform various function.

This process is affected by nervous system and endocrine system.

Nervous System → 3 parts

- ① Central nervous system
- ② Peripheral nervous system
- ③ Autonomic Nervous system

Central Nervous System

Consist of Brain and spinal cord.

~~Spinal cord~~ Brain

Brain → Soft, delicate organ which is present in Cranial cavity

Protection → ① By meninges ② By cerebrospinal fluid

* Act as a cushion and absorb shock generated from impact.

* Provide Buoyancy
* Giving nourishment
* Waste elimination

Structure of Brain

- ① Forebrain → ① olfactory lobe → Centre for smell
- ② Cerebrum → Memory, thinking, learning, Judgement
Control centre. It contain
 - a) Occipital lobe → Centre for Sight
 - b) Temporal lobe → Understanding speech and language.
 - c) Parietal lobe → Sensation of Pain, taste, touch etc.
 - d) Frontal lobe → Control Voluntary actions.

② Mid brain → Concerned with hormones

③ Hind brain → ① Pons → regulate respiration

② Medulla → control involuntary action like swallowing, coughing, sneezing.

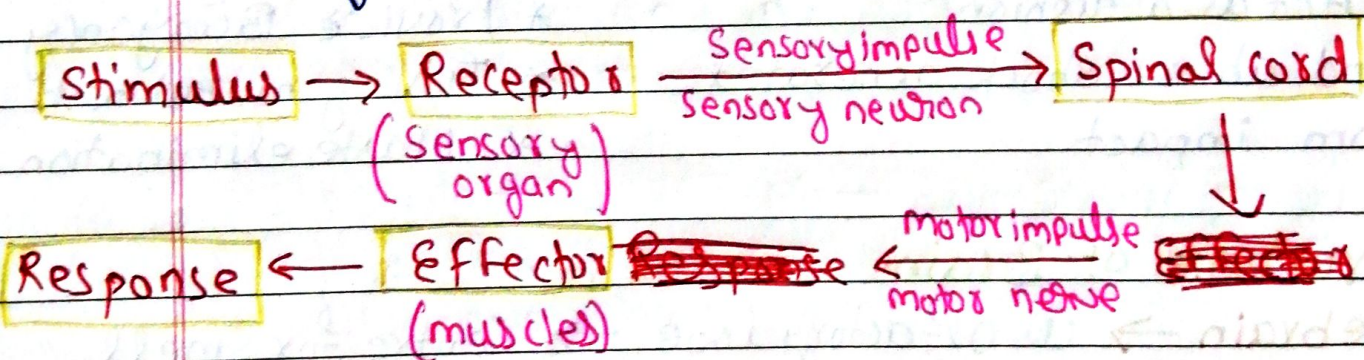
③ Cerebellum → Maintain balance and posture of body.

② SPINAL CORD → ① Concerned with reflex action

② Involved in Reflex action.

Reflex action → Sudden involuntary actions done in response to a stimulus

Reflex arc → Path travelled by nerve impulse during a reflex action.

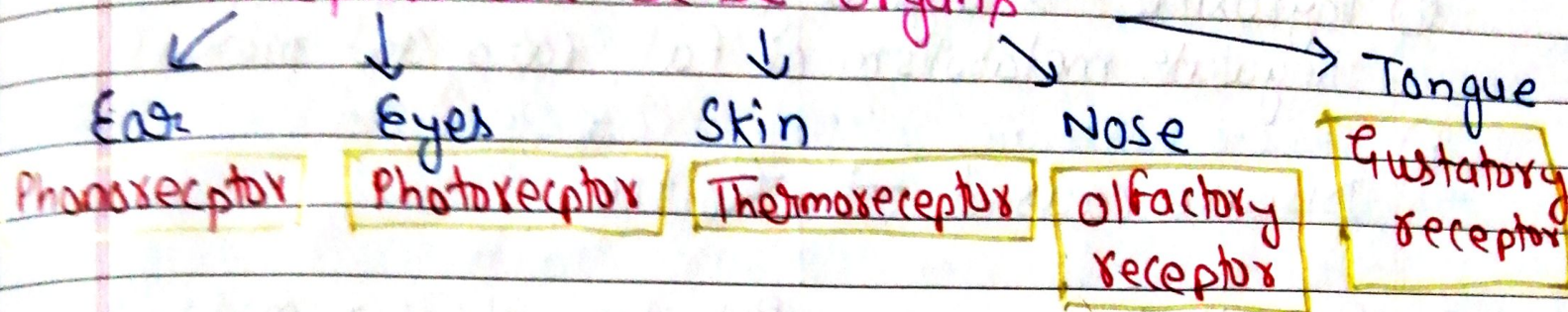


* Stimulus → Any change in environment or within body that bring about rxn.

* Response → Rxn of our body to stimulus

* **Receptors** → These are modified or specialised tips of some nerves cell that detect various changes in environment.

Receptors are Sense Organs



Neuron → Structural and functional unit of nervous system. It has 3 main parts

- ① Dendrite → Information is acquired
- ② Axon → Transfer information to nerve ending
- ③ Synapse → Electrical signal is converted to chemical signal here and transmitted to next neuron by release of neurotransmitter such as acetylcholine

⇒ **Synapse** → Gap b/w axon of one neuron and dendrite of another neuron.

Cranial nerve

- * Originate From Brain
- * 12 pairs
- * Relay information b/w brain and parts of body

Spinal nerve

- * Originate From spinal cord
- * 31 pairs
- * Send information to C.N.S.

⇒ **C.N. + S.N. → Peripheral nervous system**

- * Hormone → chemical substances which are produced at one site and show action of another site.
- * Usually travel in blood stream.

① Thyroxine → Thyroid gland → Neck/Throat
Regulate metabolism of fat, carb and protein

Disease caused → Goitre

② Growth hormone → Pituitary gland → Mid brain
Regulate growth and development

③ Adrenaline → Adrenal gland → Above both kidneys.
Increase metabolism during emergency by regulating heart beat, blood pressure etc.

④ Testosterone → Testis → Lower abdominal area
Sperm production and development of secondary sexual character.

⑤ Estrogen → Ovaries → Lower abdominal area
Develop female genital organ and bring secondary sexual character.

⑥ Progesterone → Ovaries → Lower abdominal area
Prepare body for pregnancy related changes

⑦ Insulin → Pancreas → Below stomach
Lower blood sugar level by converting excess glucose into glycogen

8. Glucagon → Pancreas → below stomach
Increase blood sugar level by converting glycogen to glucose

feed back mechanism

The process in which onset or offset of one hormone is controlled by another hormone

- 2 Type ① Positive → Hypothalamus release → ~~Releasing hormone~~ Releasing hormone → Stimulate Pituitary gland to secrete growth hormone.
- ② -ve ⇒ Hypothalamus release → Inhibiting hormone → Stimulate pituitary to ~~release~~ stop growth hormone secretion.

Plant hormones → Also known as Phytohormone

- ① Auxin → Help in growth, Promote phototropism
- ② Gibberellin → Promote Flowering and growth of stem
- ③ Cytokinin → Promote cell division and cell enlargement.
- ④ Abscissic acid → Inhibition of growth and wilting of leaves
- ⑤ Ethylene → Fruit ripening, inhibitory effect on growth.

Tropism → Movement of Plant in direction of stimulus. Also called tropic movement

- ① Phototropism → movement towards light e.g. shoot
- ② Geotropism → " " gravity e.g. root
- ③ Hydrotropism → " " water e.g. root
- ④ Chemotropism → " " chemicals e.g. pollen tube

* **Neuromuscular Junction** → The point where muscle fibre comes in contact with a motor neuron carrying nerve impulse from C.N.S.

* **Endocrine gland**

- a) Ductless
- b) Secrete hormone
- c) Secretion go to blood then to target site

Exocrine gland

- May or may not have ducts
- Secrete enzymes
- Secretion directly go to Target site.

* **Nastic movement** → Movement is due to external stimulus, but movement is not dependent on direction of stimulus. Also known as growth independent movement e.g. Touch me not plant (*Mimosa pudica*)