STIMULI

STIMULUS

The changes in the environment to which living organisms respond or react are called **STIMULI**.

For example: Light, heat, cold, smell, taste, touch, pain, water, pressure, force of gravity.

CONTROL AND COORDINATION IN PLANTS

1. Plant do not have a **NERVOUS SYSTEM** but do they sense things like light, water, touch, chemical and gravity.
2. Instead of **NERVOUS SYSTEM** **PLANTS USES PLANT HORMONES FOR COORDINATION OF THEIR BEHAVIOR AGAINST ENVIRONMENTAL CHANGES.**
3. In plant, function of **CONTROL AND COORDINATION IS PERFORMED BY PLANT HORMONES.**

CONTROL AND COORDINATION IN PLANTS

FOUR MAJOR PLANT HORMONES

1. AUXINS
2. GIBBERELLINS
3. CYTOKININS
4. ABSCISIC ACID

AUXINS

a)Promotes cell enlargement & cell differentiation.

b)Promotes fruit growth.

c) It is responsible for Phototropic & Geotropic response of plants.

d)Auxins made by the cells on the tip of the stems and roots.

e)Synthetic auxins are used in agriculture and horticulture.

GIBBERELLINS

a) Promotes cell enlargement and cells differentiation in presence of auxins.

b) Breaks the dormancy or initiate germination in seeds and buds.

c) It is mainly responsible of shoot extension.

CYTOKININS

a) Promotes cells division in plants.
b) Break the dormacy of seeds and buds.
c) Delay ageing of leaves.
d) Promote opening of stomata.
e) Promote fruit growth.

ABSCISIC ACID

a) Promotes starting of dormacy in seeds and buds.
b) Promotes closing of stomato.
c) Promotes the wilting & falling of leaves.

TROPISM

The growth movement of a plant parts in response to external stimulus in which the direction of stimulus determines the direction of response is called tropism.

Positive

Growth of palnts parts towards stimulus.

Negative

Growth of plants parts away from stimulus

TYPES OF TROPISMS

Light – Phototropism

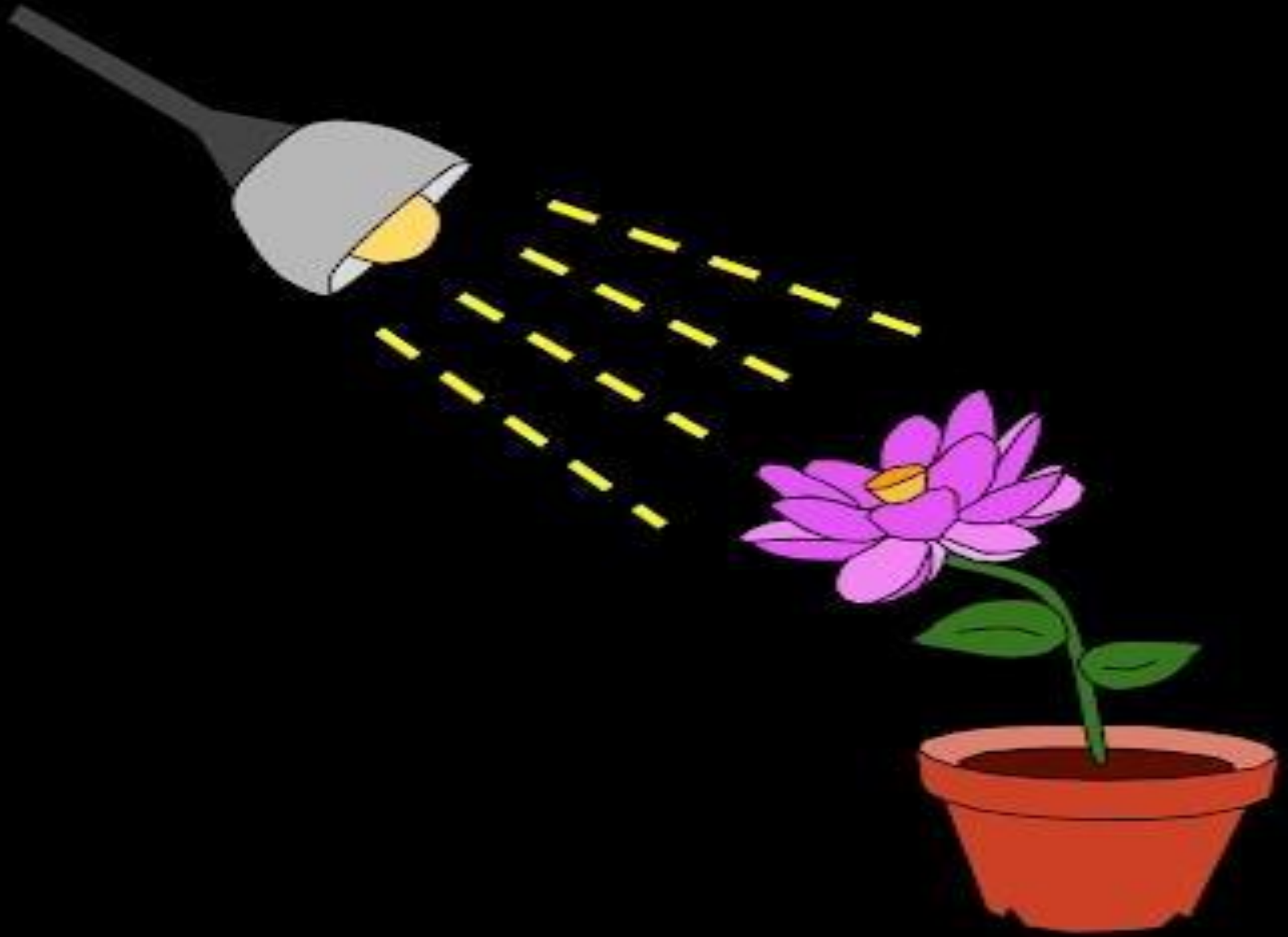
Gravity - geotropism

Water - Hydrotropism

Touch – Thigmotropism

Chemical - Chemotropism

Tropic movement help plant to survive.

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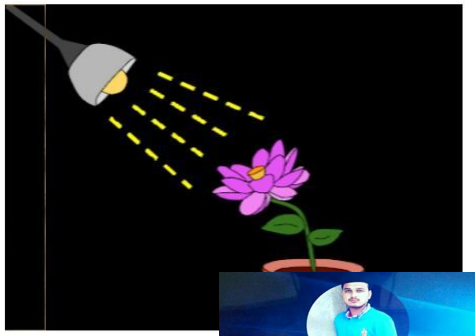

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NASTIC (NASTIC MOVEMENT)

The movement of a plant part in response to an external stimulus in which the direction of response is not determined by the direction of stimulus is called Nastic movement.

- Nastic movement may or my not be growt movement.
- For example: moon flower, Mimosa Pudica, Dandelion.

THIGMONASTY AND PHOTONASTY

Thigmonasty: The non directional movement of a plant part in response to the touch of an object is called thigmonasty.

Photonasty: The non directional movement of a plant part in response to the light is called photonasty.

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FUNCTION OF PLANT HORMONES:

- Germination of seeds
- Growth of root,stem and leaves.
- Movement of stomata in leaves.
- Flowering of plants.
- Ripenig of fruits.
- Phototropism, Geotropism, Thigmotropism, Chemotropism, Hydrotropism.

CONTROL AND COORDINATION IN ANIMALS

COORDINATION IN ANIMALS

TYPES OF ANIMALS

Have only one nervous system { Made up of nerve cells }
eg. HYDRA

SIMPLE UNICELLULAR ANIMALS

Have two system :
Nervous System {Made up of nerve cells}.
Endocrine system {made up of hormones}. eg. VERTEBRATES

COMPLEX MULTICELLULAR ANIMALS

SENSE ORGANS

THE ORGANS WHICH RECEIVES STIMULI FROM THE EXTERNAL ENVIRONMENT IS KNOWN AS SENSE ORGANS.

- NOSE
- EAR
- TONGUE
- EYES
- SKIN

RECEPTORS

It is a cell or group of cell in sence organ which is sensitive to particular stimulus such as LIGHT, SOUND etc.

EFFETORS

It is a part of body which can respond to the stimulus according to instructions sent from the nervous system (spinal chord and brain) eg. MUSCLE & GLANDS

TYPES OF RECEPTORS

- PHOTORECEPTORS: Receptors which can detect light. { Present in eyes.}
- PHONORECEPTORS: Receptors which can detect sound . { Present in ears }
- OLFACTORY RECEPTORS: Receptors which can detect smell. { Present in nose }
- GUSTATORY RECEPTORS: Receptors which can detect taste. { Present in tongue }
- THERMO RECEPTORS: Receptors which can detect heat or cold.{ Present in skin }

FUNCTION OF RECEPTORS

ALL THE RECEPTORS IN SENSE ORGANS RECIEVE / DETECT STIMULI FROM SURROUNDING ENVIRONMENT AND SEND THE MESSAGE TO BRAIN

FUNCTION OF EFFECTORS

ALL THE EFFECTORS IN BODY GIVE RESPONSE TO THE EXTERNAL STIMULI WHEN IT RECIEVES INSTRUTIONS FROM THE BRAIN.

CONTROL AND COORDINATION IN HUMAN

Human have two sysems for control and coordination

- Nervous system
- Central nervous system
- Peripheral Nervous System

- Endocrine system (hormonal system)

HUMAN NERVOUS SYSTEM :

Function:

- The function of nervous system is to coordinate the activities of our body.
- Nerous system helps all other systems of our body to work together like Breathing, Heart beat, Reading, Writing, Cycling and daning.

Note:- Human nervous system recieves information from the surrounding - process it, interpret it and respond accordingly.

STRUCTURE OF NERVOUS SYSTEM

NERVOUS SYSTEM IS MADE UP OF NERVE CELLS OR NEURONS.

Neurons:

- **Neuron is the largest cell in the body.**
- **Neurons transmits message in the form of eletrical signals called Nerve impulse or electrical impulse.**

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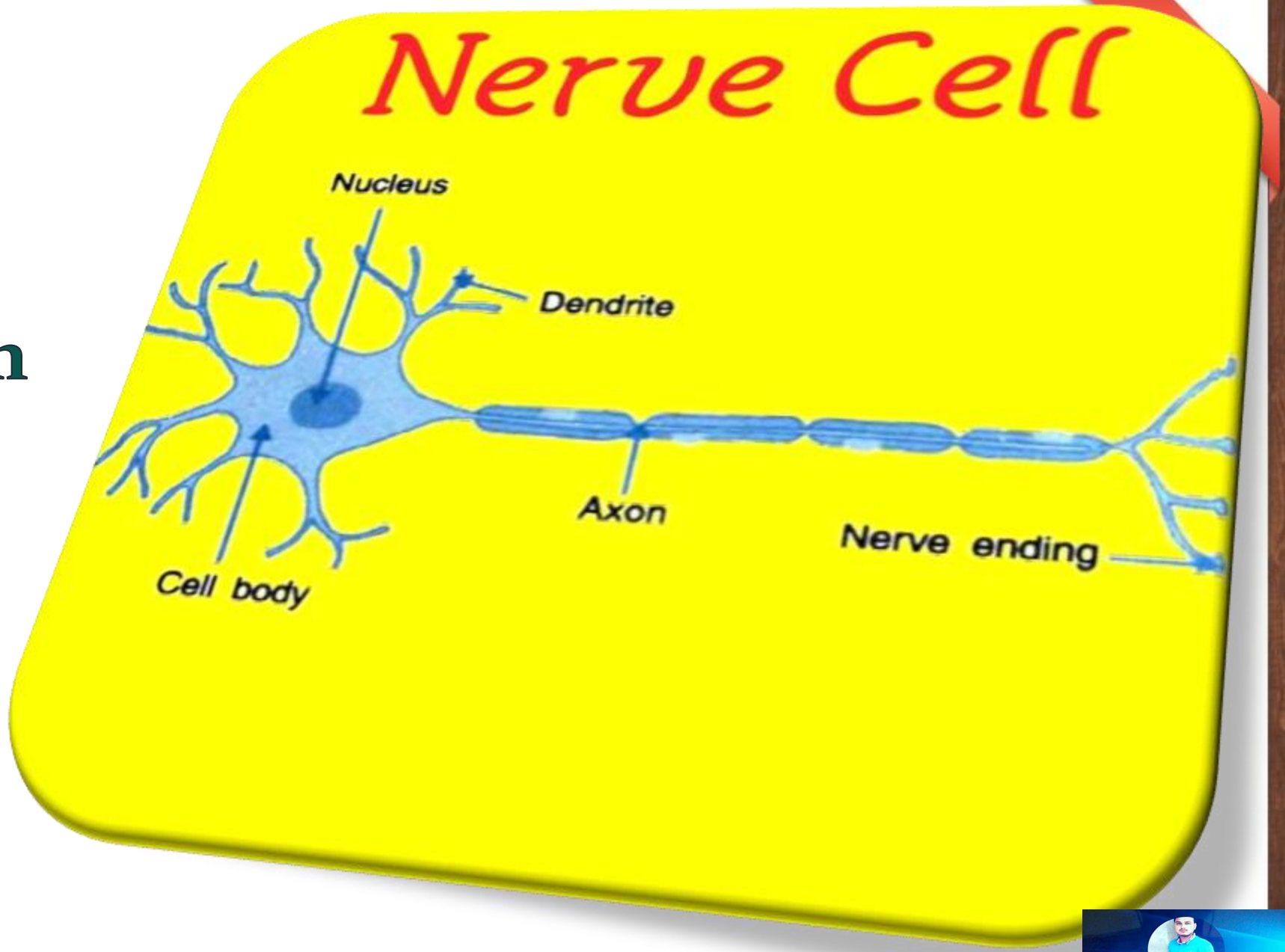
STRUCTURE :

- Dentrites
- Axon
- Myelin Sheath
- Nerve ending
- Cytoplasm
- Nucleus



DENDRITES

- Nerve fiber
- Size- Shorter
- Receive- Nerve impulse from sensory organs.

AXON

- Nerve fiber
- Size- Longer
- Receive- impulse from dendrites and send it to other neurons through synapse

SYNAPSE: It is a microscopic gap between two adjacent neurons through which nerve impulses passes from one Neuron to another neuron.

TYPES OF NEURONS

- **Sensory Neurons:** Receptors in sensory neurons recieve impulse from environment & transmit to relay neurons and send it to spinal chord.

- **Motor Neurons:** Receive intructions from spinal chord & send it to effectors.

- **Relay Neurons:** Transmits or shares nerve impulse b/w sensory neurons & motor neurons.

ORGANS OF HUMAN NERVOUS SYSTEM

CENTRAL NERVOUS SYSTEM (BRAIN + SPINAL CORD)

PERIPHERAL NERVOUS SYSTEM (Cranial , Spinal, Visceral Nerves)

❖ PERIPHERAL NERVOUS SYSTEM

It is made up of all nerves in the body.

NERVES:

Cranial nerves - Arises from the brain and spread throughout the brain.

Spinal nerves - Arises from the spinal cord and spread throughout spinal cord and body.

Visceral brain - Special type of nerves arises from the spinal cord. Viseral nerve connected to the internal organ.

PERIPHERAL NERVOUS SYSTEM

AUTONOMIC(INVOLUNTARY)

- Function automatically
- Control and regulates the functions of the internal organs of our body.
- Eg. Breathing, Blinking of eyes, Yawning, Sneezing, coughing.

VOLUNTARY

- **Functions under voluntary control of the brain.**

REFLEX ARC : THE PATHWAY OR ROUTE TAKEN BY A NERVE IMPULSE IN A REFLEX ARC.

REFLEX ACTION : AUTOMATIC RESPONSE TO A STIMULUS IS KNOWN AS REFLEX ACTIONS.

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CENTRAL NERVOUS SYSTEM

Organs: Brain and Spinal cord.

BRAIN

↓

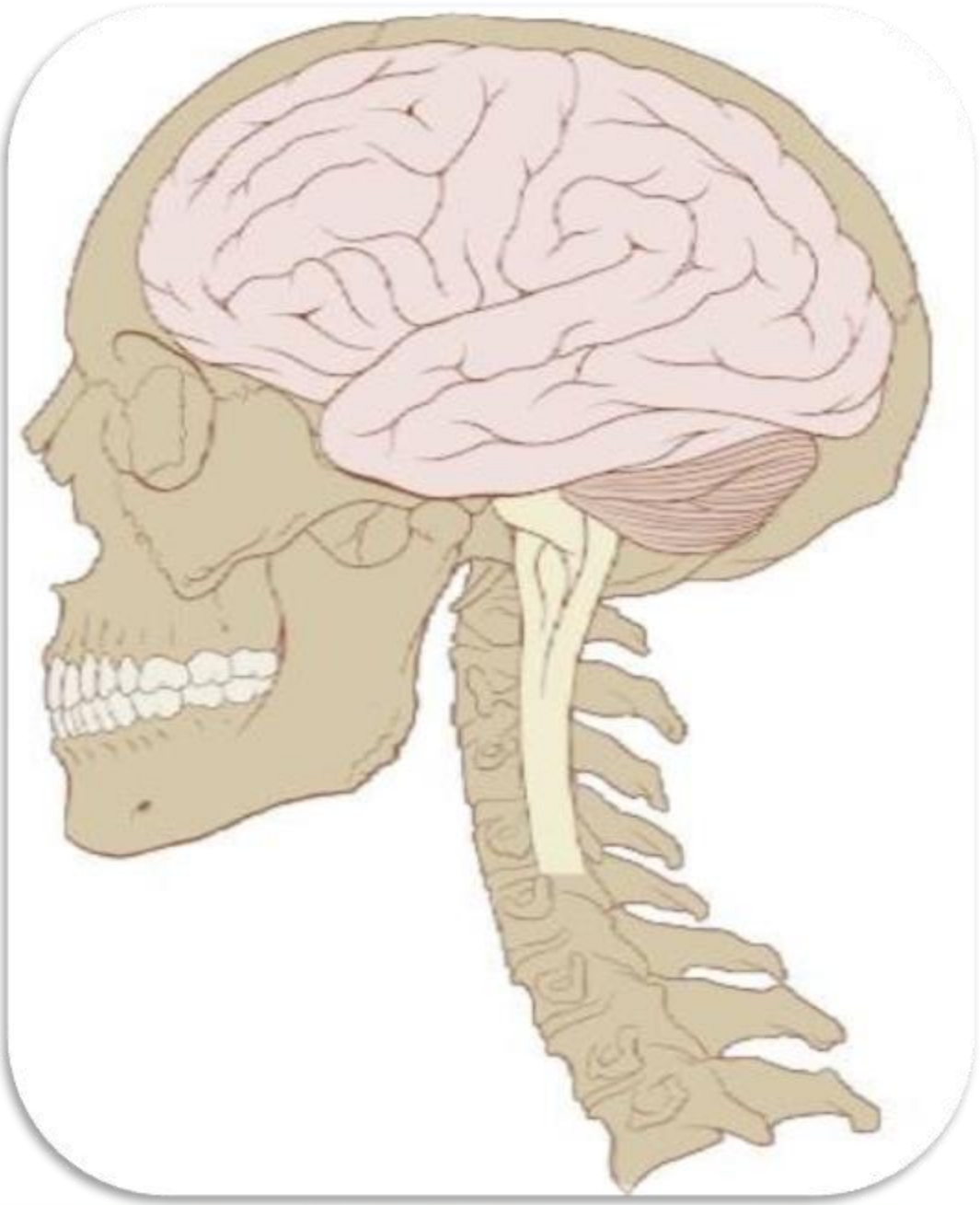
SKULL

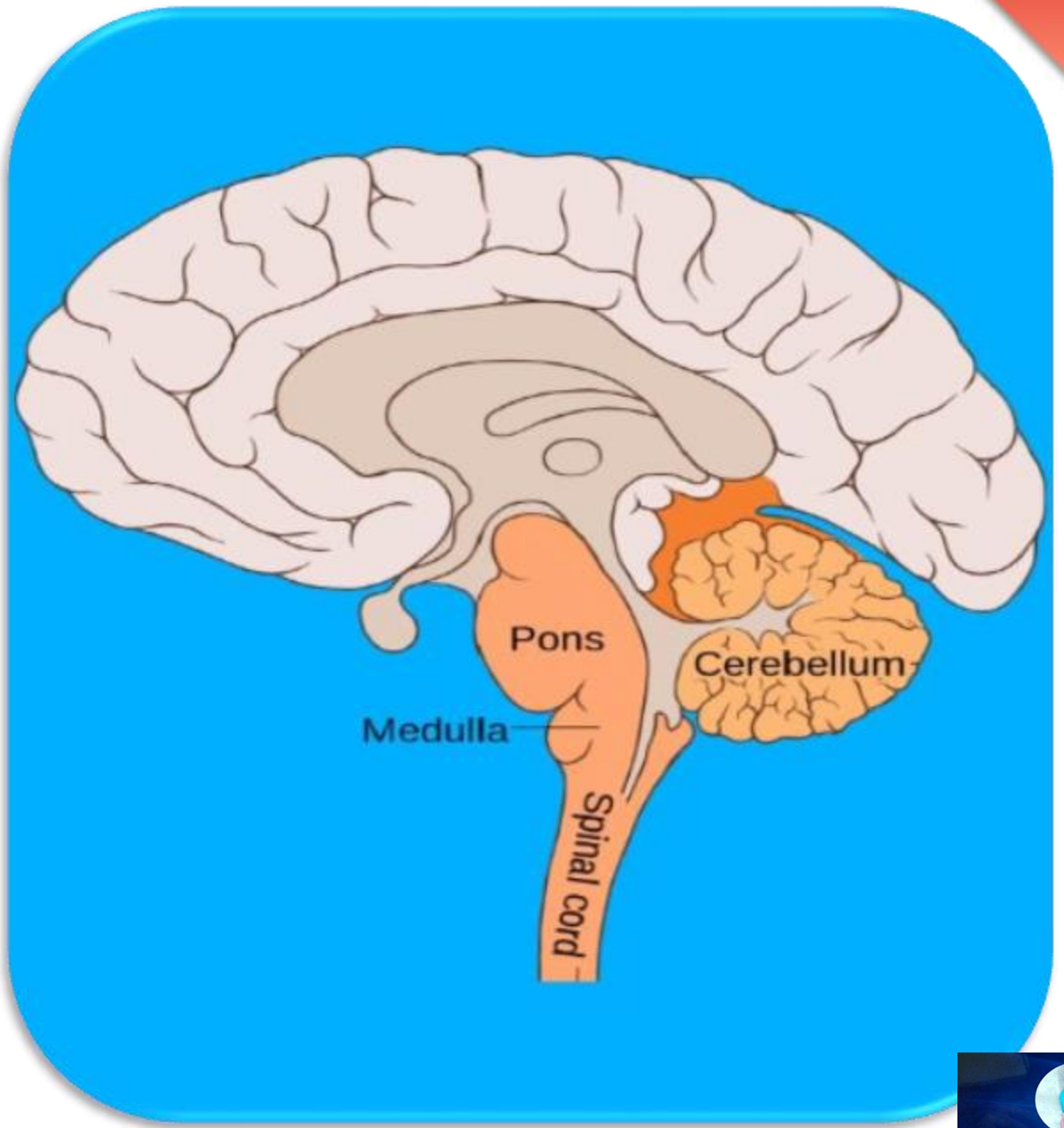
↓

COVER WITH MEMBRANES FOR PROTECTION

↓

SPACE BETWEEN MEMBRANES
IS FILLED WITH CEREBO FLUID PROTECT AGAINST MECHANICAL STRESS





BRAIN

FORE BRAIN

CERE BRAIN

MID BRAIN

HYPOTHALAMUS GLAND

HIND BRAIN

PONS
CEREBELLUM
MEDULAA

FUNCTION OF FOREBRAIN

CEREBRUM

- Thinking Part of the brain.
- This part of the brain is responsible for learning, reasoning, personality, intelligence, memory.
- All the voluntary action are coordinated by the Cerebrum.

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FUNCTION OF MIDBRAIN

HYPOTHALMUS GLAND

- The mid brain control the reflex moment of body (Head, Neck, & Trunk) in response to visual and auditory stimuli.
- It also controls the reflex moments of the eye muscles.

FUNCTION OF HIND-BRAIN

PONS:

- It regulates the respiration process in humans.

CEREBELLUM:

- It maintain the body posture and balance of the body while moving.
- Cerebeum coordinates body moments like walking, riding, dancing etc.

FUNCTION OF HIND-BRAIN

MEDULLA

- It controls various involuntary action (automatic actions) such as heart beat, blood circulation, breathing, blood pressure and perstatic movements.
- It also controls reflex moments such as swallowing, coughing, sneezing, secretion of saliva and vomitting.

SPINAL CORD

STRUCTURE: Cylindrical

- It is enclosed with boney cage called vertebral column.
- It is also surrounded by menings for protections.
- It controls the spinal reflex action.

ENDOCRINE SYSTEM

- **HORMONES:**
- It is the chemical substance which coordinate activities and growth in the living ORGANISMS.
- Hormones are also called as a chemical messengers.
- Hormones are secrets by endocrine glands.

GLANDS:

It is a cell or tissue which secrets specific substance (Chemical) in the body.

TYPES OF GLANDS

Exocrine glands: Glands With duct (Tubular pipe).

Endocrine glands: Duct less glands.

Endocrine glands are the cells and tissue which makes hormones in the body.

ENDOCRINE SYSTEM:

A group of endocrine glands produces various hormones is called an endocrine system.

Types of Hormones in ENDOCRINE SYSTEM OF HUMAN BODY

Hypothalamus Glands: present in brain, Produce releasing & Inhibitory Hormones, Controls pituitary Hormones.

TYPES OF ENDOCRINE SYSTEM IN HUMAN BODY

Pituitary Glands: It Secrets Growth Hormones.

Thyroid Glands: It Controls the metabolism rate of carbohydrates, proteins & Fats.

Parathyroid Glands: it secrets hormone called parathormone which regulates calcium & phosphate levels in blood.

Thymus Glands: It Secrets hormone called Thymus which is important for immune system in Human.

Pancreas: It Secrets hormone called Insulin which lowers the sugar level in blood.

Adrenal Glands: It Secrets adrenaline hormone which regulates heart rate, breathing rate, blood pressure Etc.

Testis: Produce male sex hormones called testosterone which regulates metabolism of male sex organs & Male body features.

Ovaries: Produce female sex hormones called progesterone & Oestrogen which regulates metabolism of Female sex organs & Female body features.