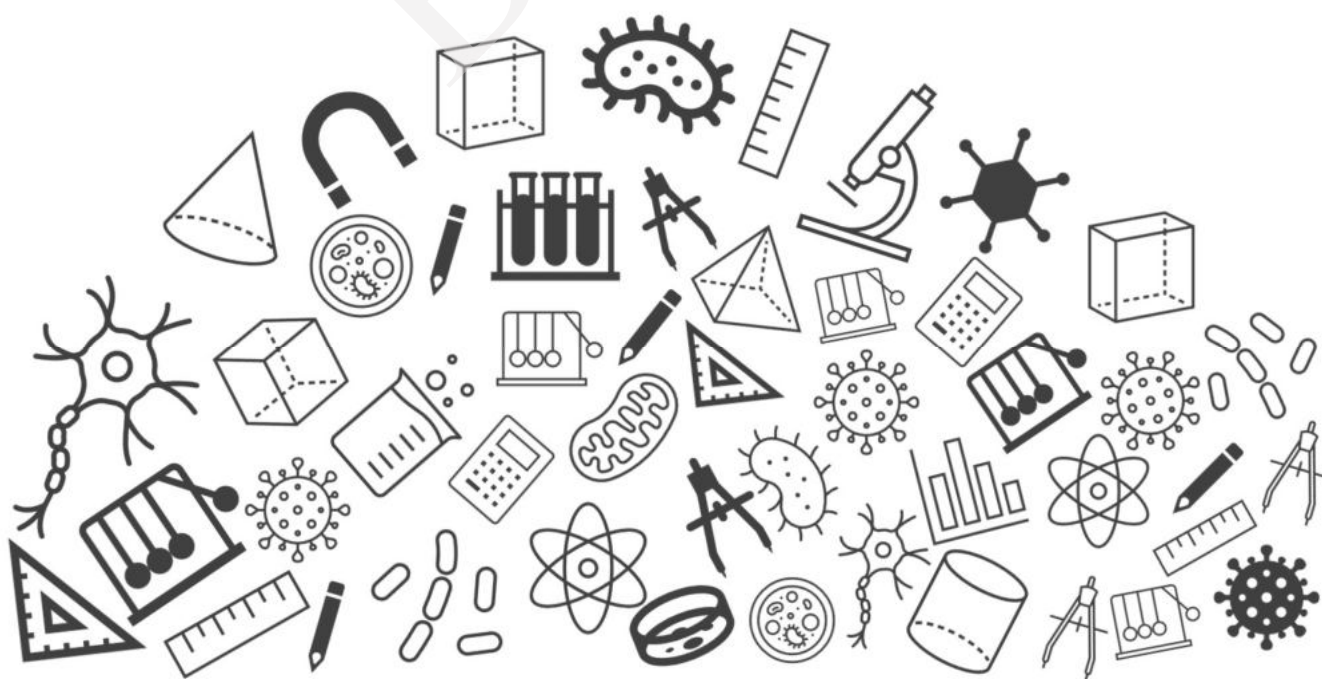
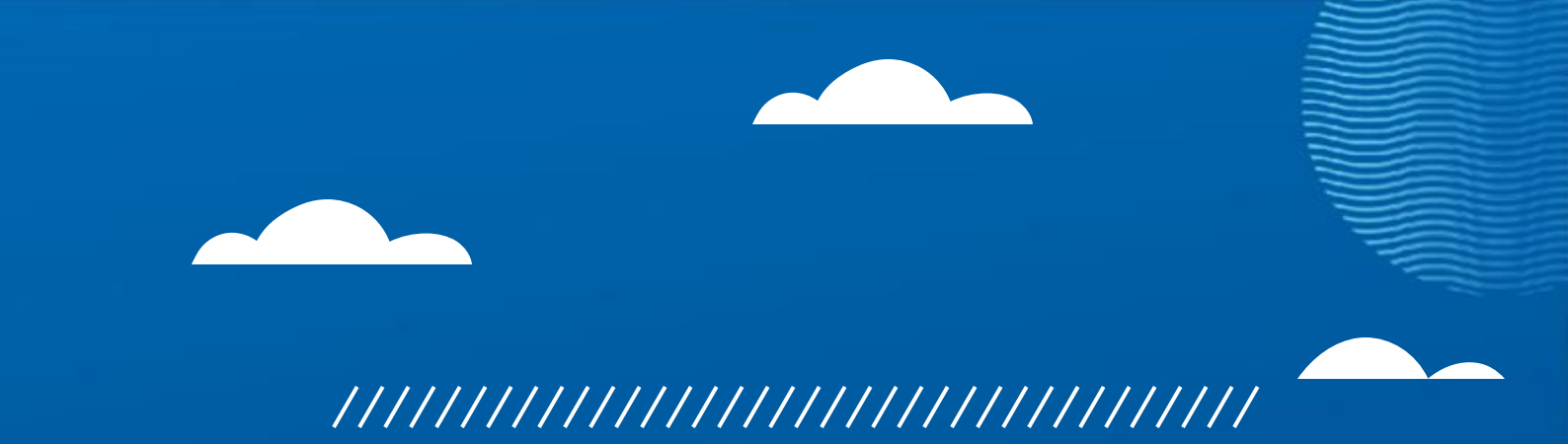




Grade 10: Science

Chapter Notes





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BYJU'S Classes

Class Notes

Control and coordination

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Grade 10



Topics to be Covered

B

1

– **Control and coordination**

2

– **Nervous coordination**

2.1 Neuron

2.2 Types of neuron

2.3 Types of nervous system

3

– **Central nervous system**

3.1 Parts of brain

4

– **Peripheral nervous system**

4.1 Nerve and its types

4.2 Reflex action and reflex arc

5

– **Chemical coordination**

5.1 Endocrine glands

5.2 Hormones and functions

6

– **Coordination in plants**

6.1 Plant movement

6.2 Plant hormones

Mind Map

B

- Auxin
- Cytokinin
- Ethylene
- Gibberellin
- Absciscic acid

Plant hormones

- Tropism
- Nastism

Plant movements

Plants

Control and coordination

Animals

Nervous coordination

Chemical coordination

CNS

- Brain
- Spinal cord

PNS

- Spinal nerves
- Cranial nerves

- Hypothalamus
- Pituitary
- Pineal
- Thyroid
- Adrenal
- Pancreas
- Gonads

1. Control and Coordination

B

Control and coordination are the functions of the nervous system and hormones in animals and humans.

Control and coordination in animals

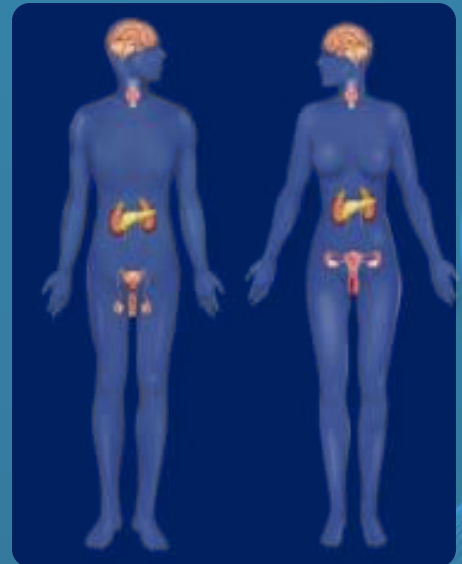
Animals

Nervous coordination



Uses **electrical signalling** to control all the body functions

Chemical coordination



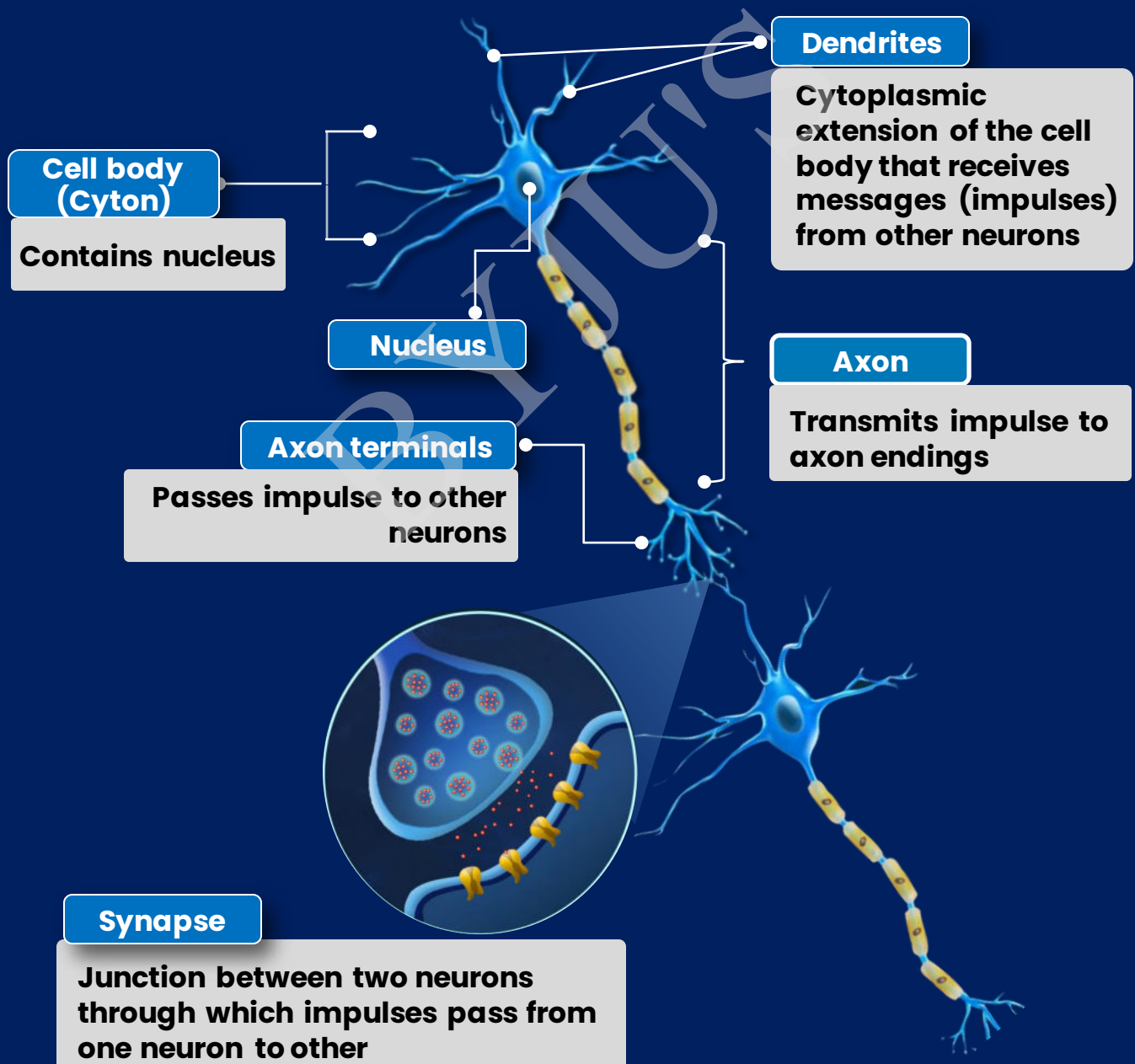
Uses **chemical signalling** to coordinate all the body functions

2. Nervous Coordination

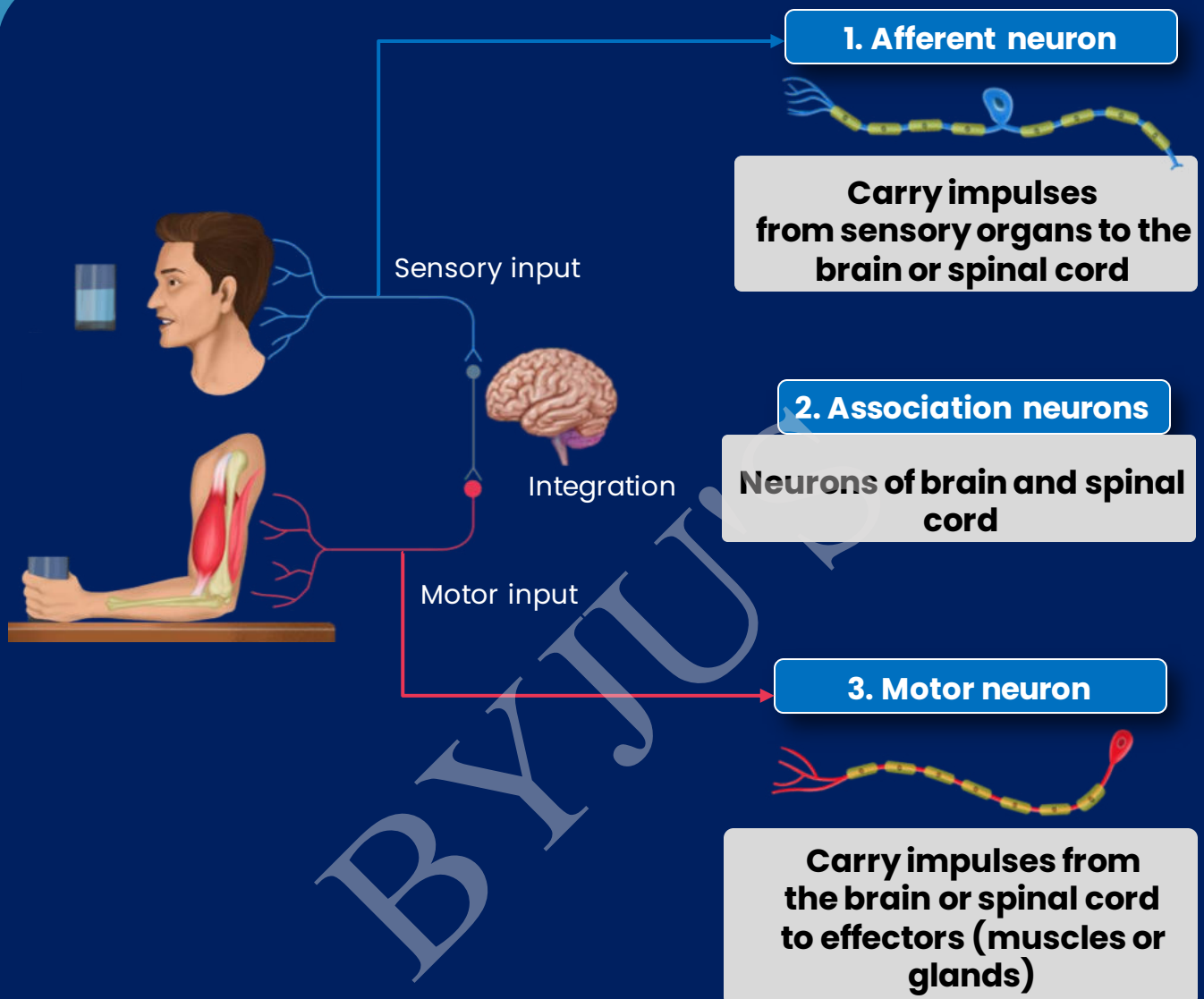
It is performed by nervous system which is a network of nerve cells and fibres that transmits nerve impulses between different parts of the body.

2.1 Neuron(Nerve cell)

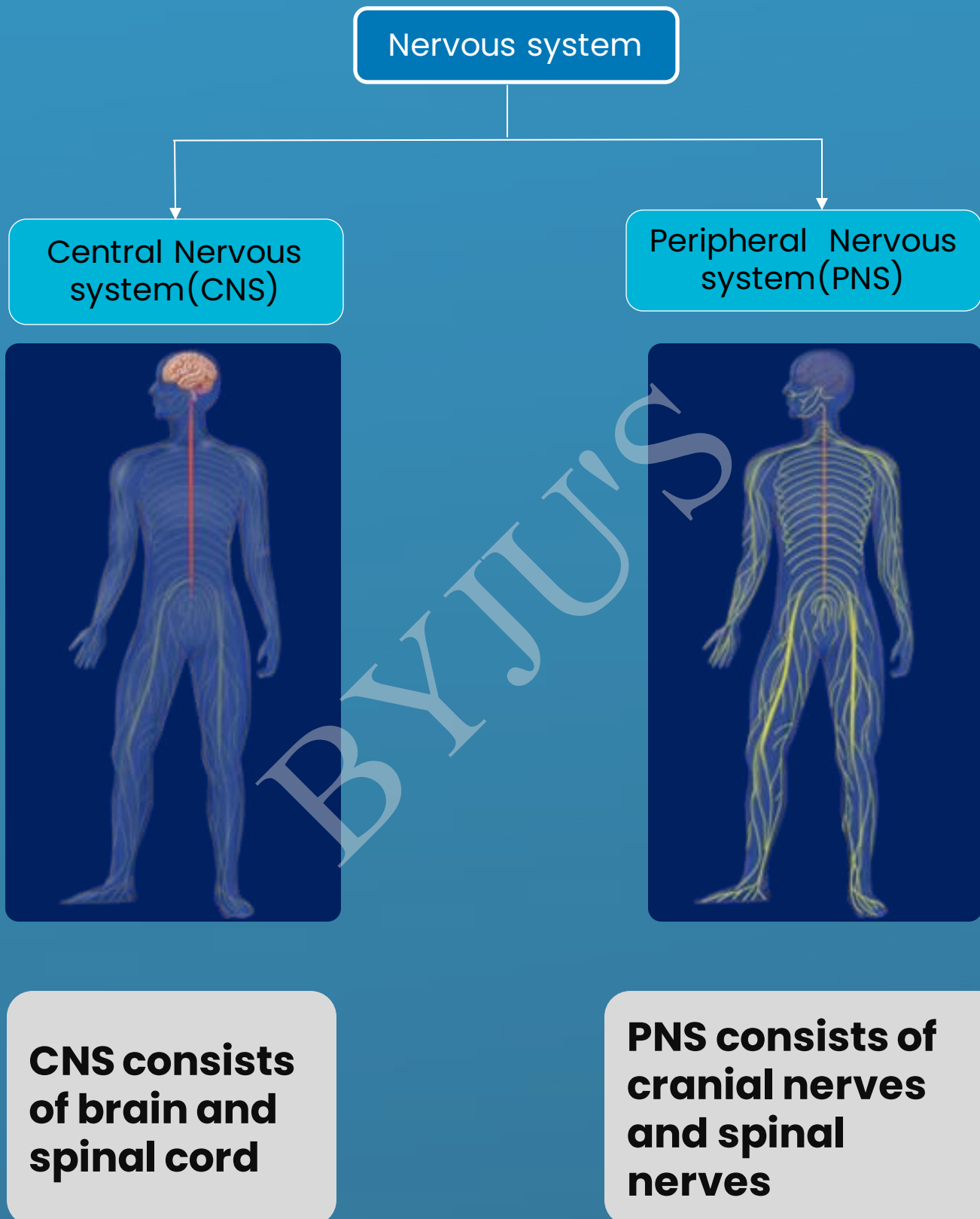
The structural and functional unit of the nervous system which is highly specialised for being stimulated and then transmitting the stimulus within the body.



2.2 Types of neurons



2.3 Types of nervous system



3. Central Nervous System

B

Brain

Main coordinating centre of the body

Cranium

Hard bony protective covering of the brain



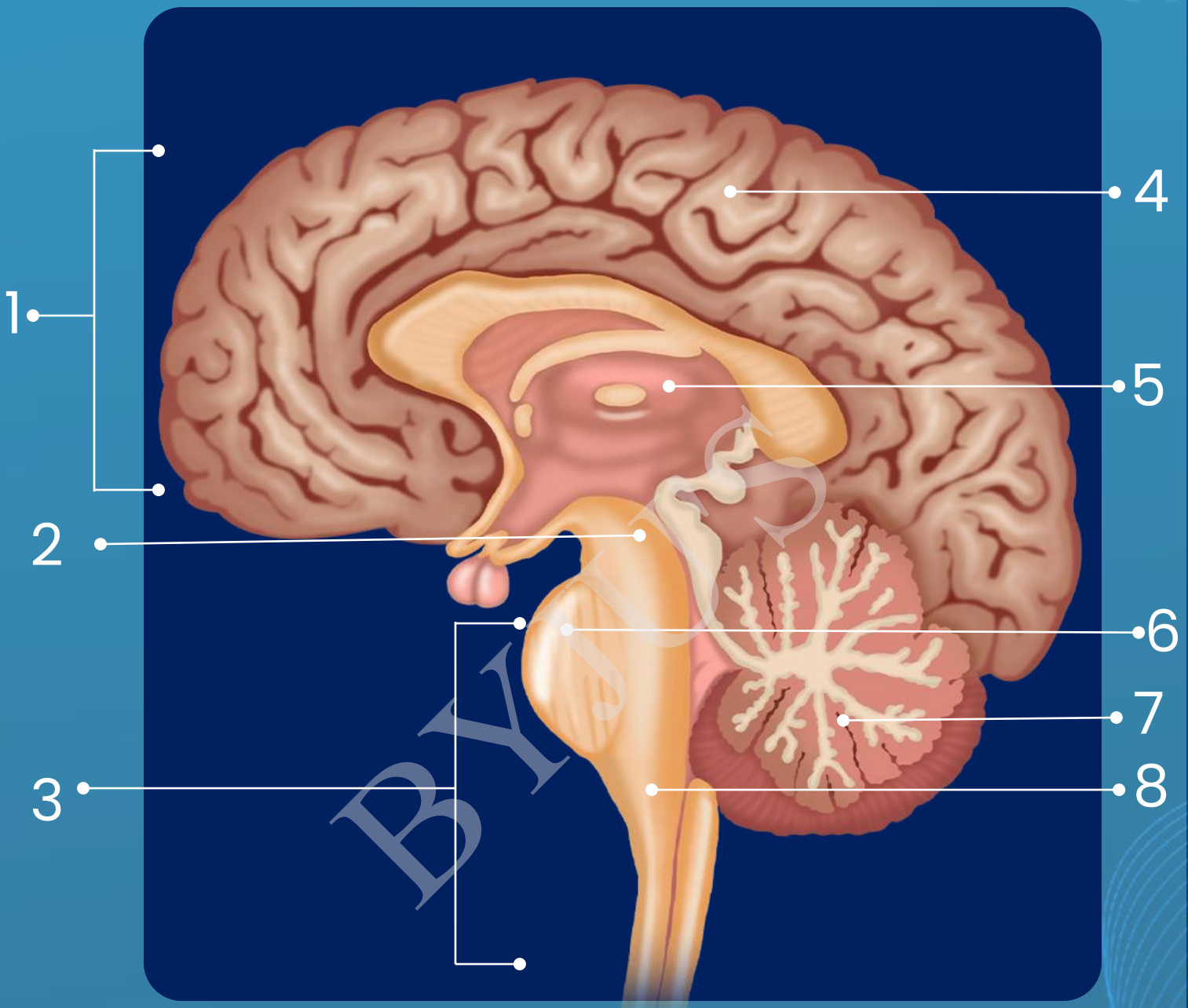
Vertebral column

Protective covering of the spinal cord

Spinal cord

Long tubular structure from the base of the brain and down to the spine

3.1 Parts of brain



1- Forebrain

2- Midbrain

3- Hindbrain

4- Cerebrum

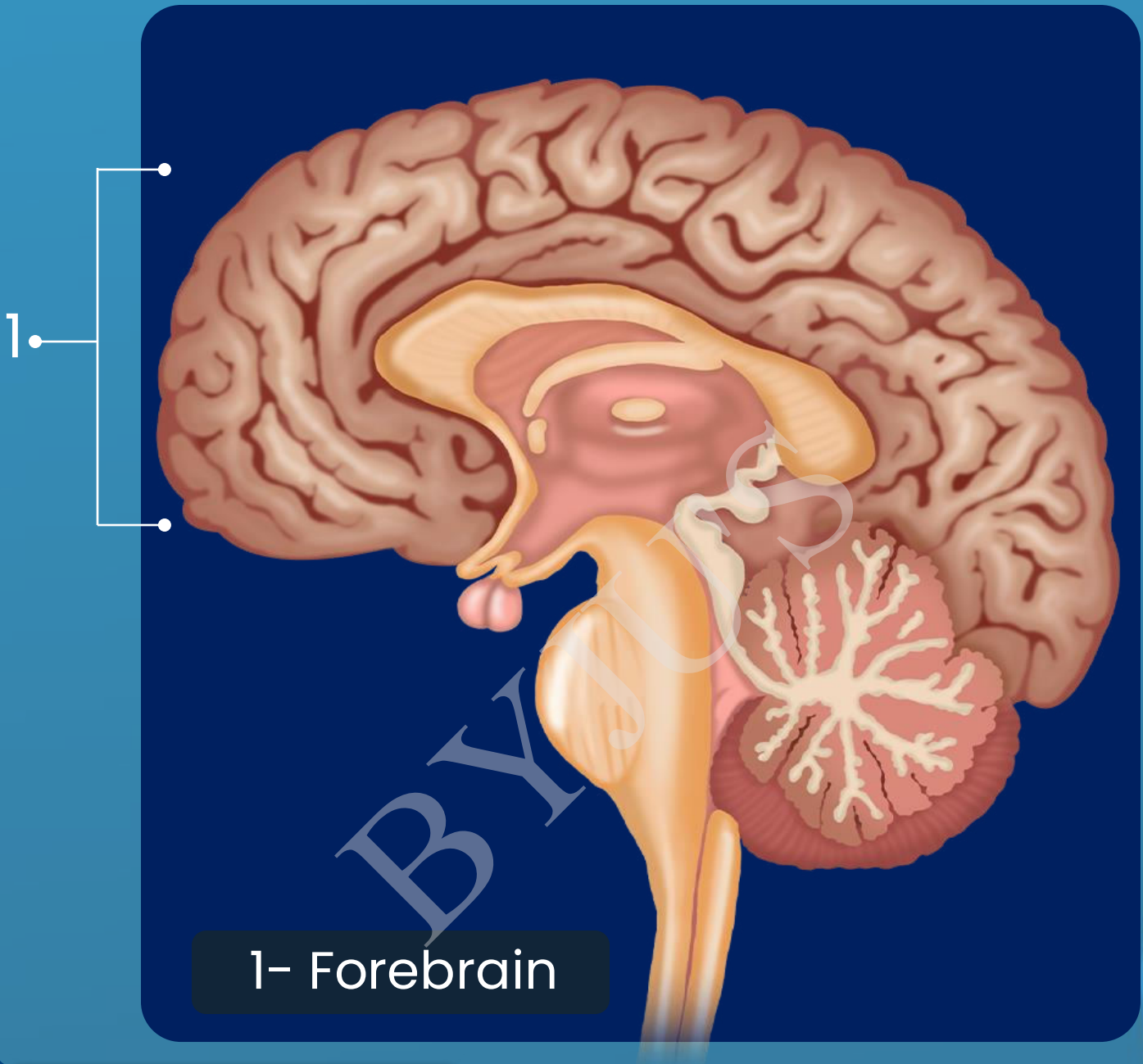
5- Diencephalon

6- Pons

7- Cerebellum

8- Medulla
oblongata

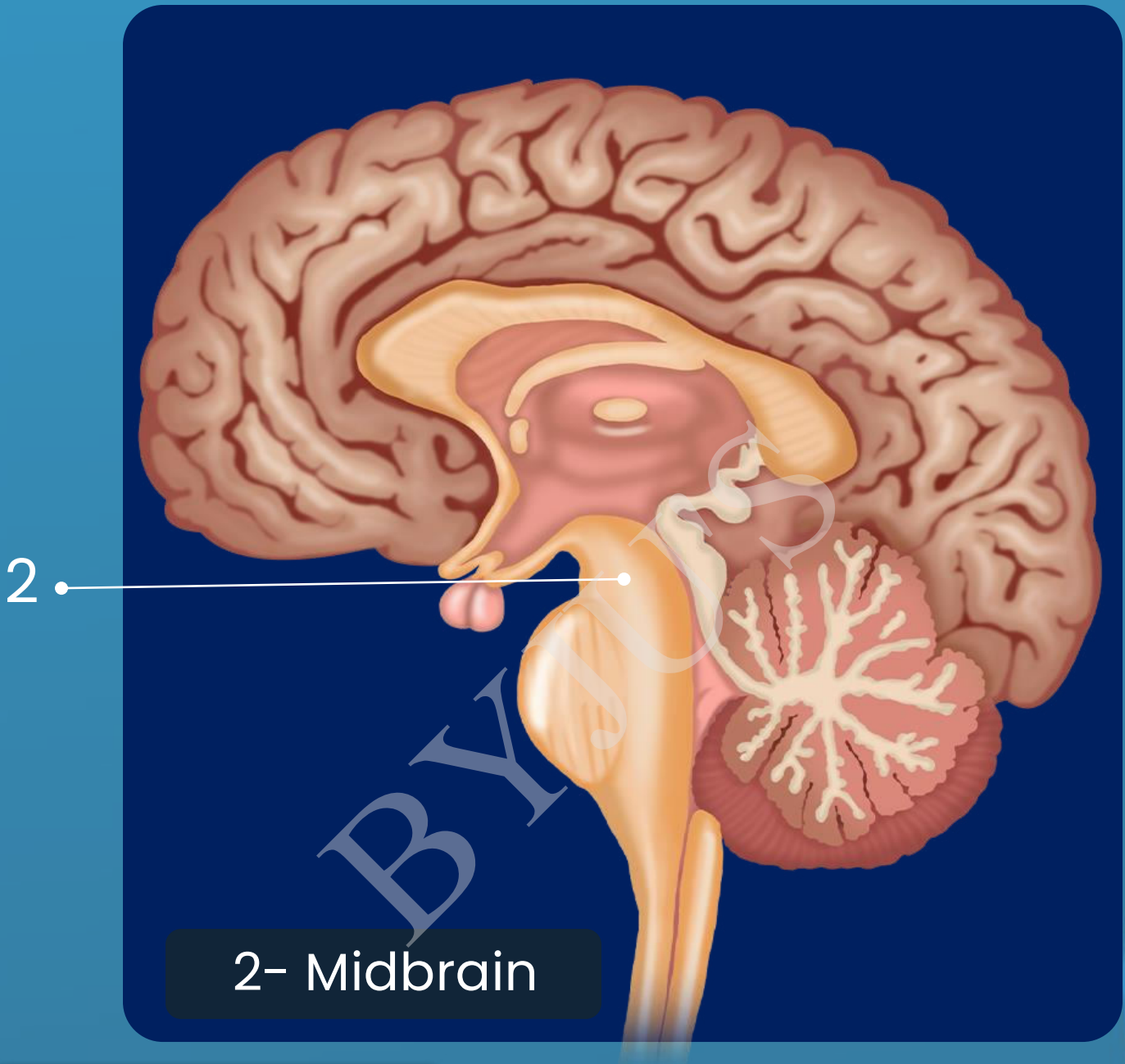
Forebrain



Functions

- The important part of forebrain is the **cerebrum**.
- The **cerebrum** is the **largest** part of the brain.
- The cerebrum controls **thinking, intelligence, voluntary actions, memory, reasoning, emotions, hearing, smell, sight, and speech.**

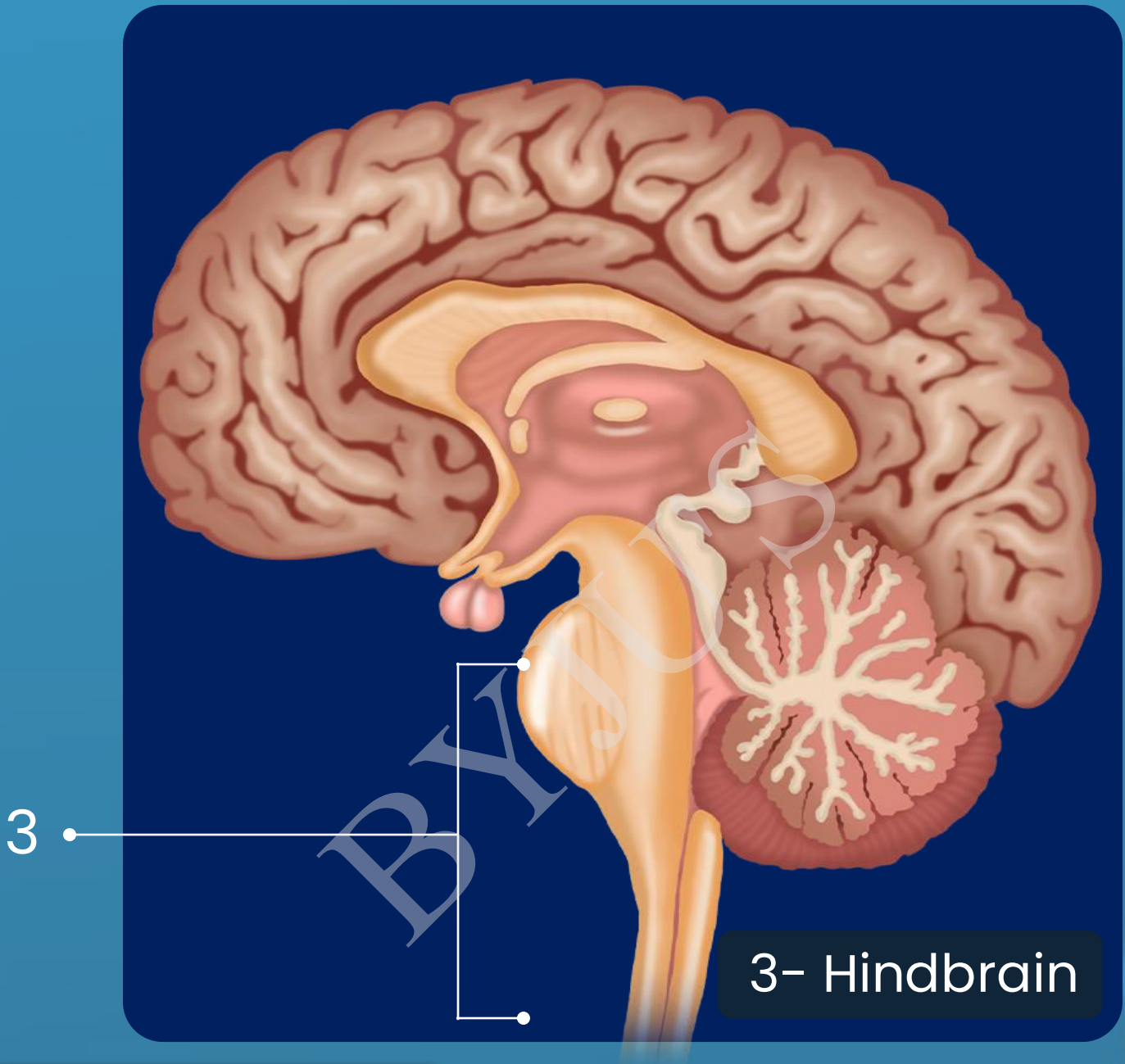
Midbrain



Functions

- Relays motor impulses from cerebrum to the spinal cord
- Relays sensory impulses from the spinal cord to the forebrain
- Visual and auditory reflexes

Hindbrain



3- Hindbrain

Functions

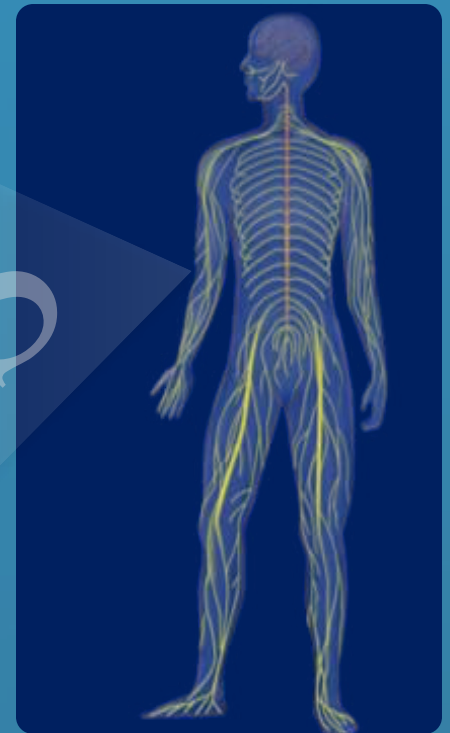
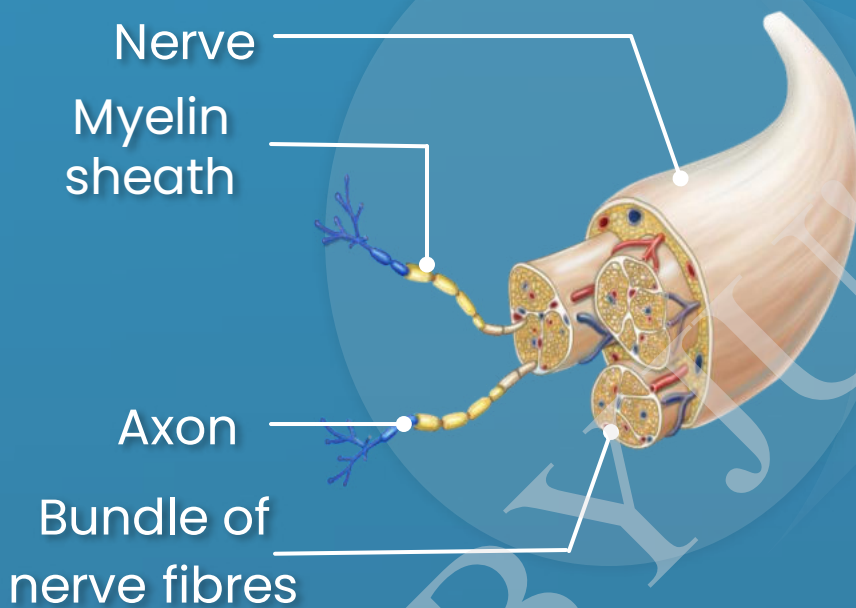
- The hindbrain consists of cerebellum, medulla and pons.
- Cerebellum maintains posture and balance.
- Medulla oblongata controls involuntary actions like blood pressure, salivation, and vomiting.
- Pons regulate the respiratory system.

4. Peripheral Nervous System

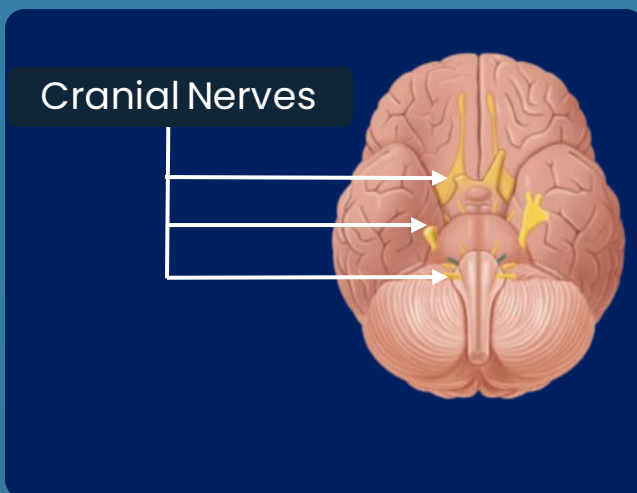
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4.1 Nerve

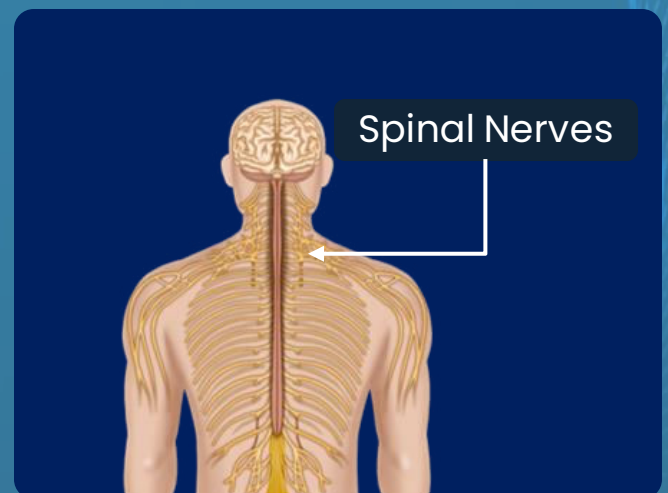
Connective tissues bind neurons which form nerve fibres, and nerve fibres bundle up to form a nerve.



Types of nerves



- Arise from the brain
- 12 pairs



- Arise from the spinal cord
- 31 pairs

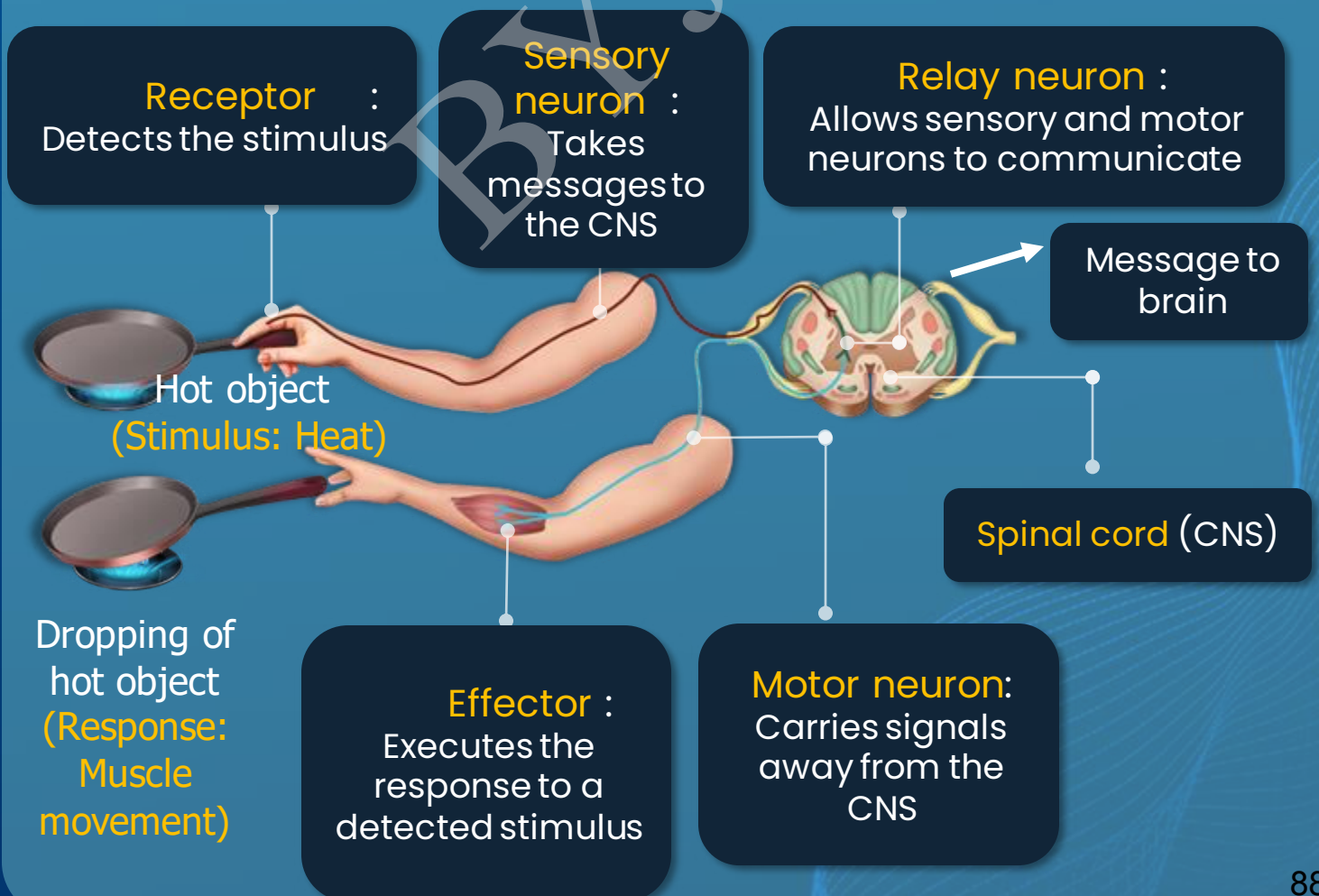
4.2 Reflex action

A sudden and involuntary response to stimuli that does not involve thinking



Reflex arc

The pathway of reflex during a reflex action

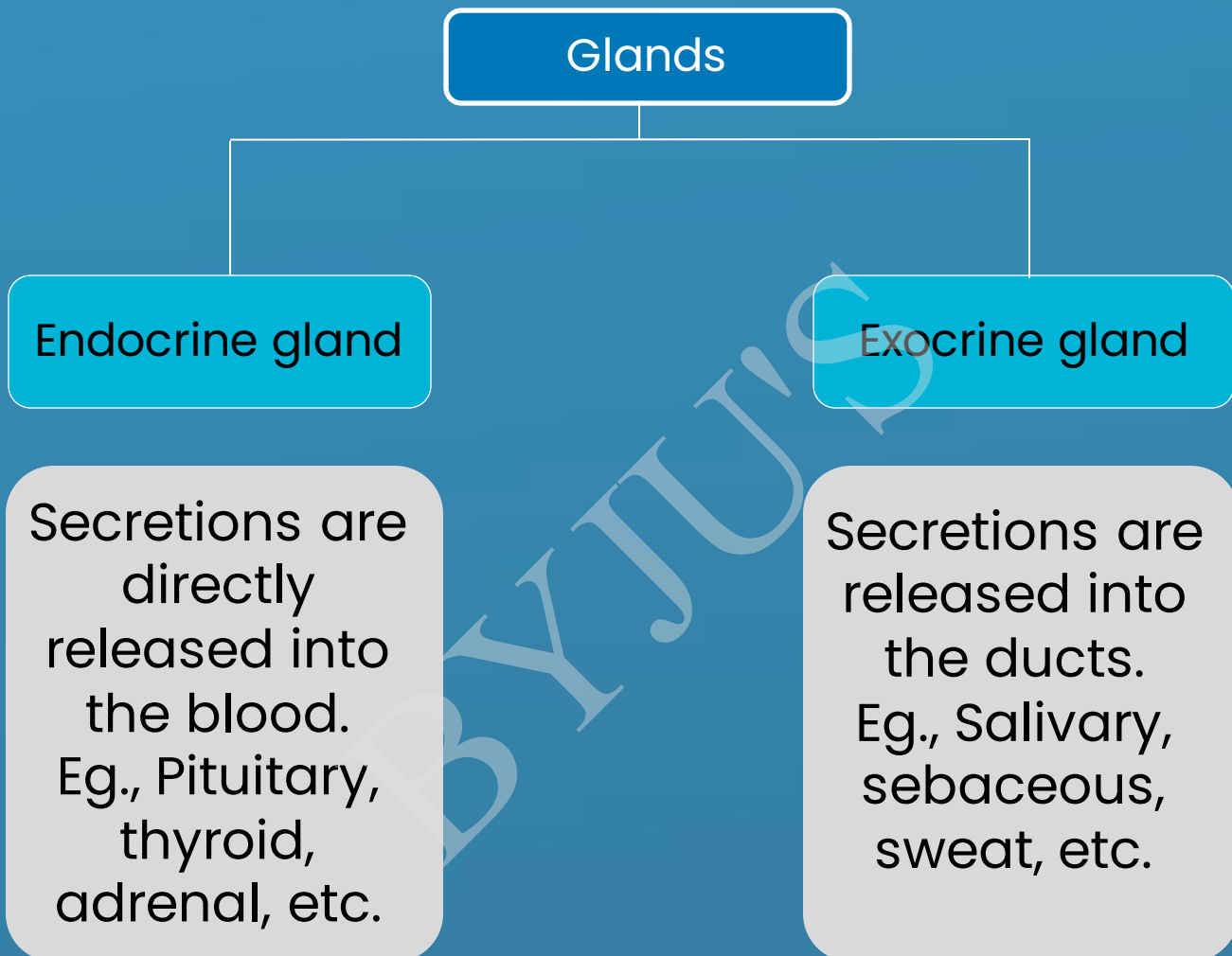


5. Chemical coordination

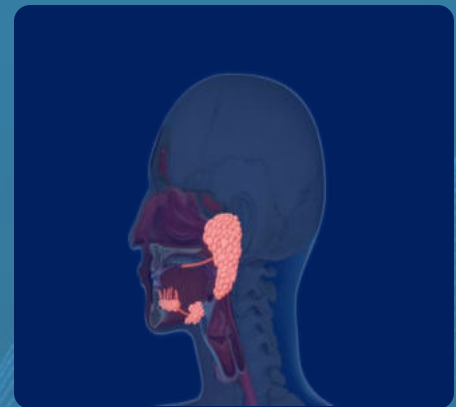
B

Glands

Organs that secrete substances such as hormones, digestive juices, tears etc.



Thyroid Gland



Salivary Gland

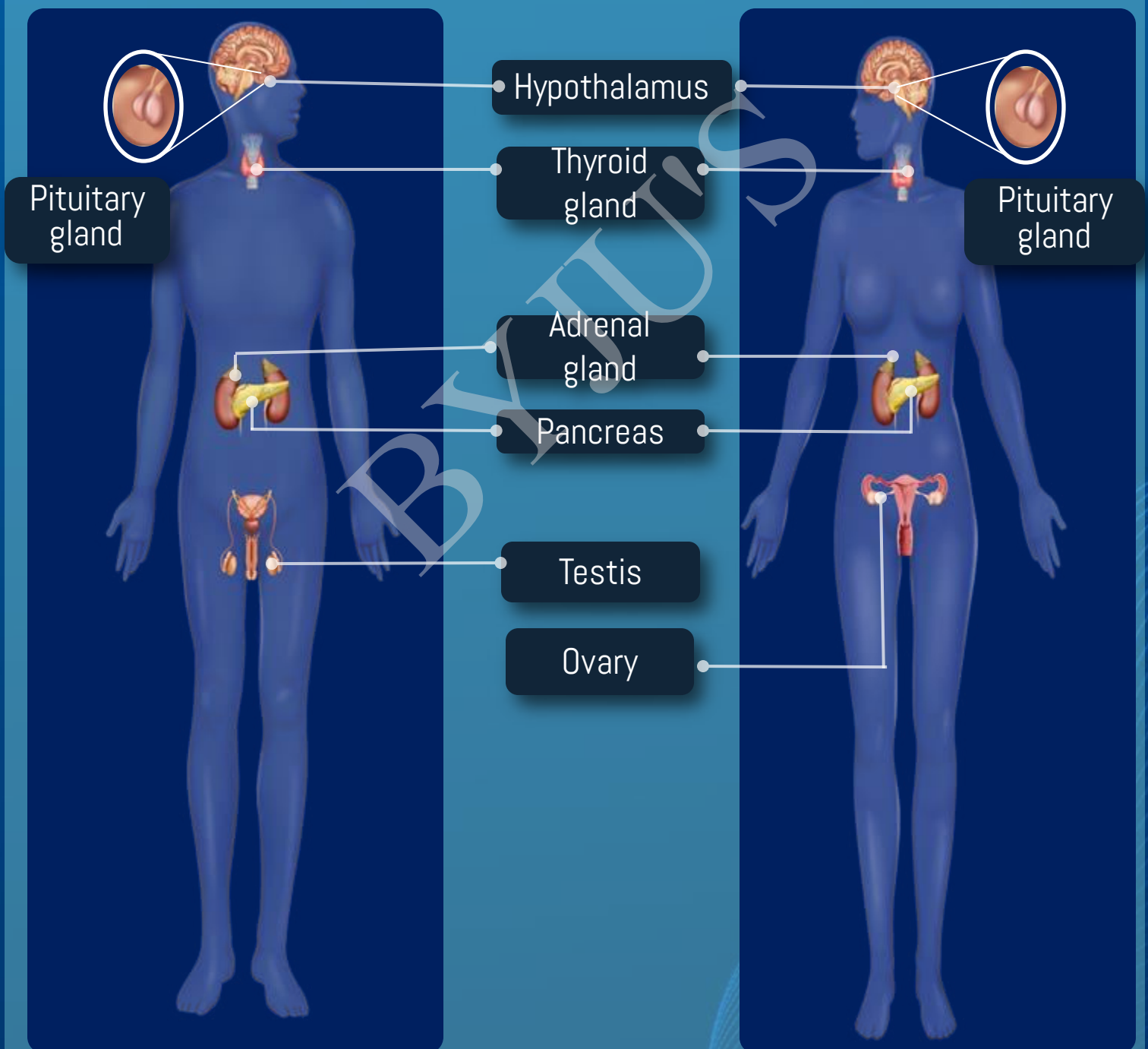
5.1 Endocrine Glands

B

Location of endocrine glands

The several endocrine glands in our body are,

1. Hypothalamus
2. Pituitary gland
3. Thyroid gland
4. Adrenal gland
5. Pancreas
6. Testis (Male)
7. Ovary (Female)



5.2 Hormones and functions

Hypothalamus plays an important role in the release of many hormones (chemical messengers). For example, when the level of growth hormone is low, the hypothalamus releases growth hormone releasing factor which stimulates the pituitary gland to release growth hormone.

Gland	Hormone	Function
Pituitary	Growth hormone	Regulates growth
Pineal	Melatonin	Regulates sleep cycle
Thyroid	Thyroxin	Regulates basal metabolism
Adrenal	Adrenaline	Induces fight or flight response
Pancreas	Insulin	Regulates blood glucose levels
Gonads	Males: Testosterone Females: Oestrogen	Development of secondary sexual characters in males and females
	Females: Progesterone	Aids in pregnancy in females

6. Coordination in plants

B

6.1 Plant movement

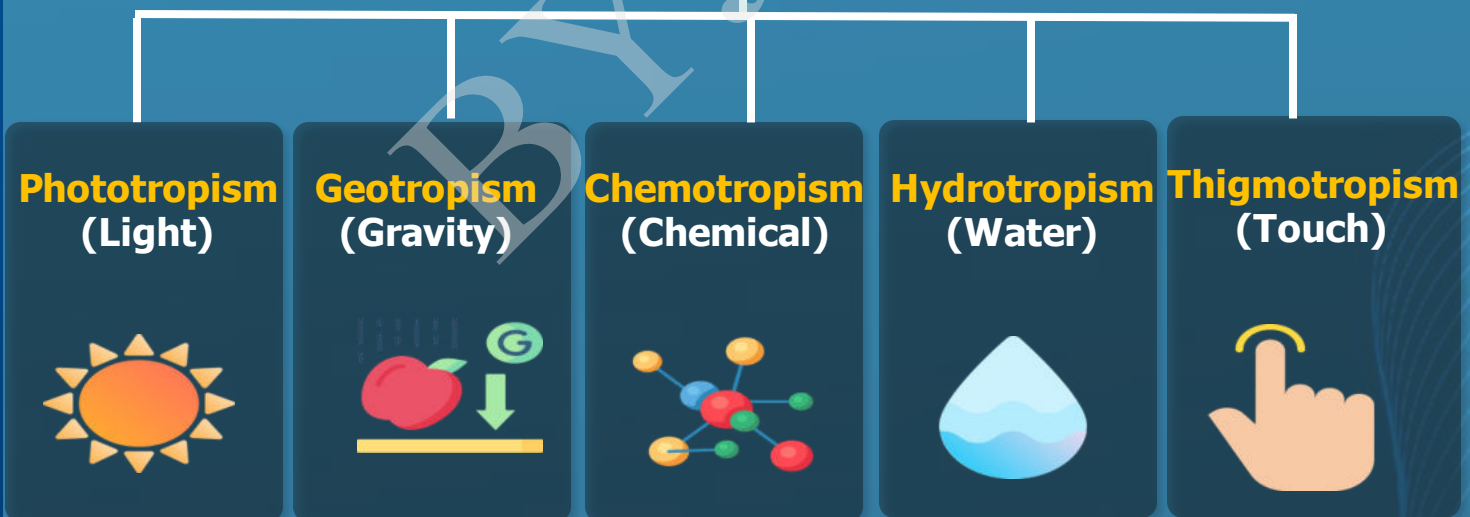
- The plants respond to stimuli and movement happens as a result of response.
- There are two types of movement namely,
 1. Tropic movement
 2. Nastic movement

Tropic movement

Tropic movements can be **positive** (towards the stimuli) or **negative** (against the stimuli).

- Growth-dependent
- Direction-dependent
- Slow response

Tropic Movements in Plants



Nastic movement

- Growth-independent
- Direction-independent
- Fast response

Thigmonasty

Nastic movement induced in plants where the stimulus is 'touch'.

Touch-me-not plants begin to fold up and droop because of changes in **turgor pressure**. It is the force within the cell that pushes the plasma membrane against the cell wall.

6.2 Plant Hormones

Plant hormones (phytohormones) are chemicals produced by plants that regulate their growth, development, reproductive processes, longevity, and even death.

The following are the plant hormones,

- 1. Auxin:** Helps in **unidirectional shoot** and **root growth**
- 2. Cytokinin:** Promotes **lateral growth** and induces **branching**
- 3. Gibberellin:** Works along with auxin for **stem elongation** and also produces **seedless fruits**
- 4. Abscissic acid (ABA):** Growth inhibitor which promotes **seed dormancy** and **closes stomata** during droughts and **reduces water loss**
- 5. Ethylene:** Helps in **ripening of fruits** and **shedding of leaves**.