

# ***KARNATAKA STATE AKKAMAHADEVI WOMENS UNIVERSITY, VIJAYAPURA***

## **Department of Food Processing and Nutrition**

Presented by – Vandana V Inamdar

Subject – Fundamentals of Human Physiology

Seminar topic – Endocrine system

Class – M. Sc I semester

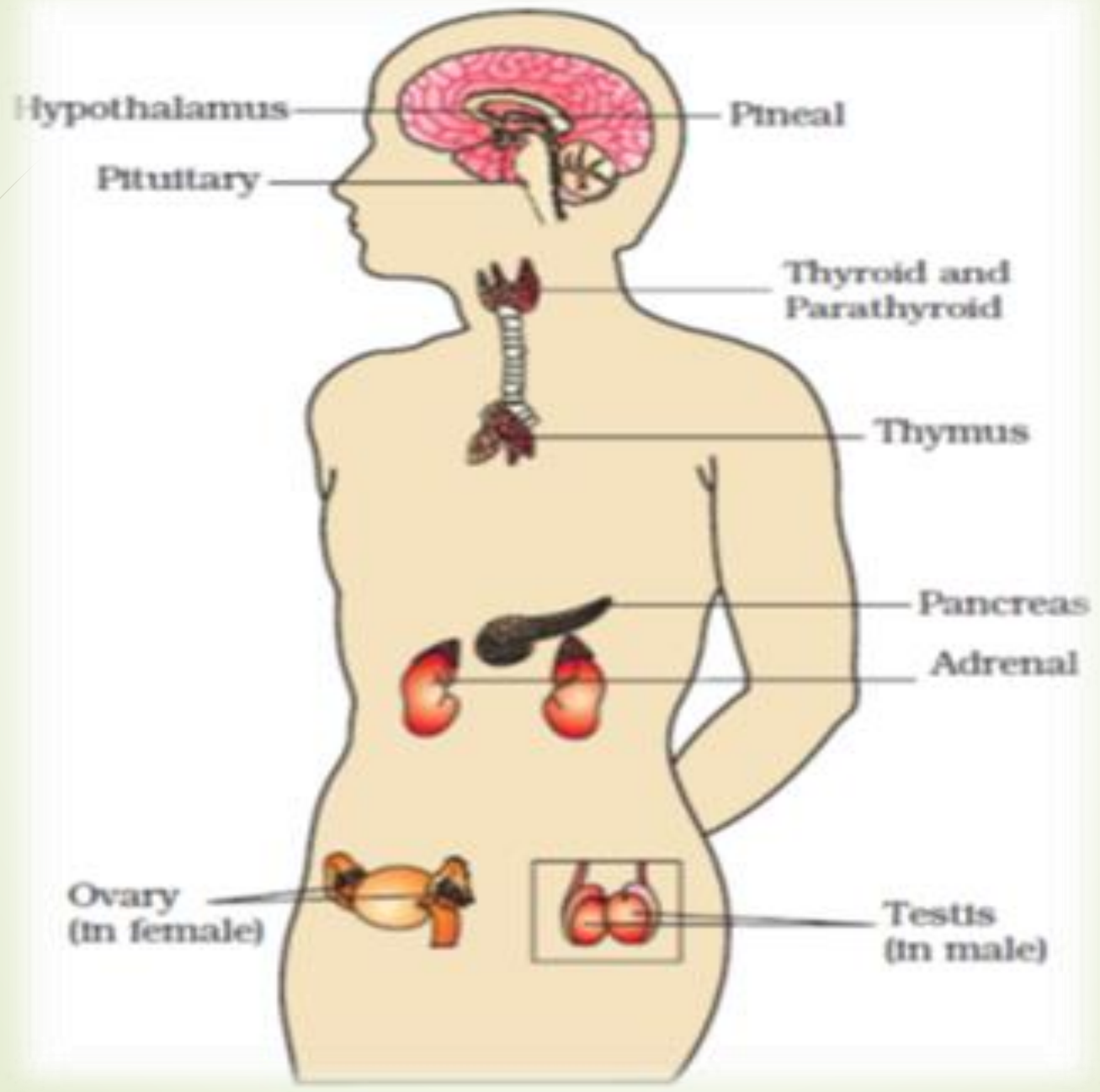
Reg No. – P10UA22S054010

# CONTENTS

- Introduction
- Endocrine glands
- 1. Pituitary gland
- 2. Thyroid gland
- 3. Adrenal gland
- 4. Pancreas gland
- 5. Pineal gland
- 6. Thymus gland
- Conclusion
- Reference

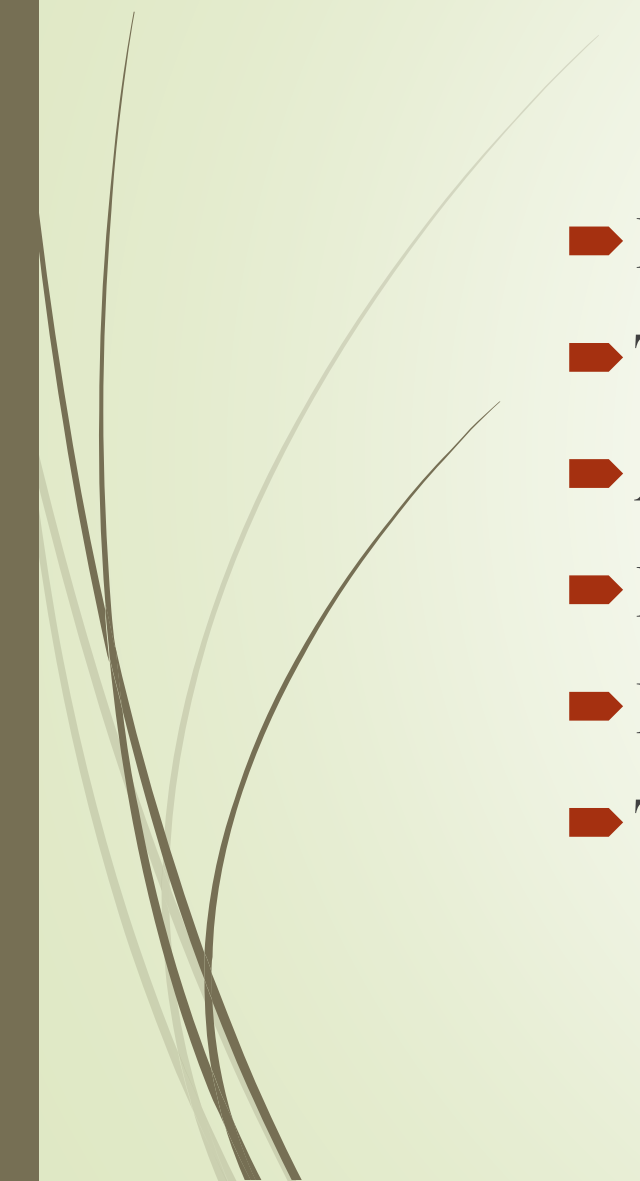
# INTRODUCTION

- The endocrine system is the collection of glands that produce hormones that regulate metabolism, growth and development, tissue function, sexual function, reproduction, sleep, and mood, among other things.
- The word endocrine derives from the Greek words "endo," meaning within, and "crinis," meaning to secrete.
- Although the hormones circulate throughout the body, each type of hormone is targeted toward certain organs and tissues.





# ENDOCRINE GLANDS

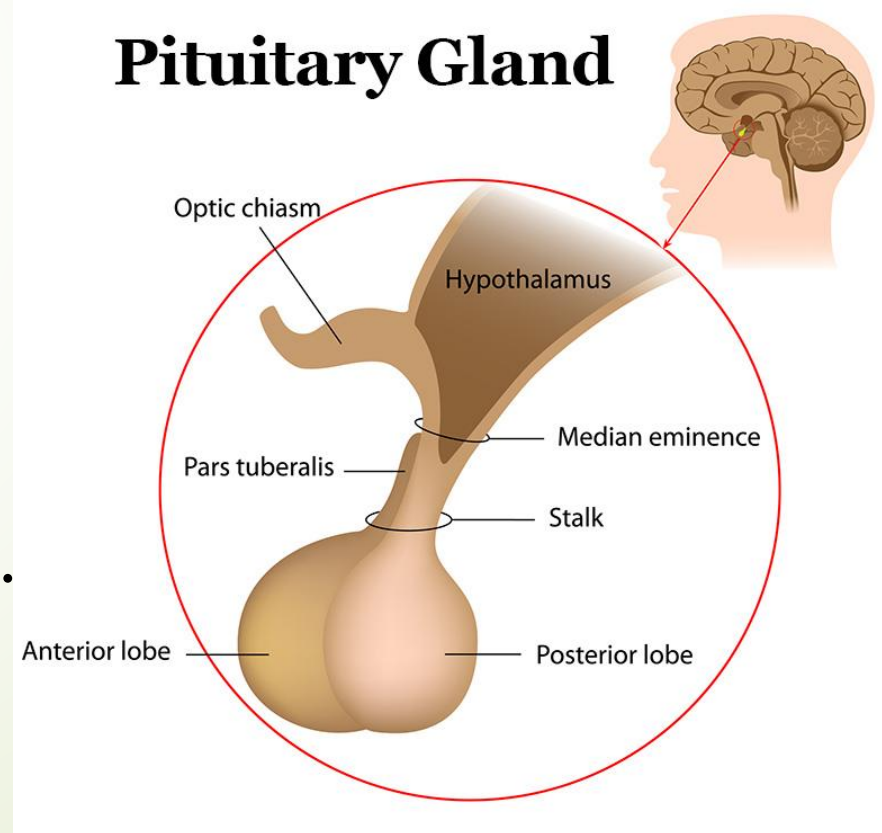
- Pituitary gland
  - Thyroid gland
  - Adrenal gland
  - Pancreas gland
  - Pineal gland
  - Thymus gland
- 

# PITUITARY GLAND

The pituitary gland is endocrine gland smaller than a pea in size but carries out very important functions.

It is called as master gland. It measure only 1.2-1.5cm its length and weight is 1.5 gram.

- It has well protected location with in the skull ventricle surface of brain.
- It lies in the hypophyseal fossa of sphenoid bone below hypothalamus.
- It consists of two glands- each of different type.
  - Anterior pituitary gland (adenohypophysis)
  - Posterior pituitary gland (neurohypophysis)





## Anterior Pituitary gland

The anterior pituitary gland secretes several major hormones.

Tropic hormones stimulates another endocrine gland to grow and secrete its hormones.

It consist of epithelial cell.

Thyroid stimulating hormone- TSH stimulate the thyroid gland to secrete thyroid hormone.

- T3-tri-iodothyroxine
- T4- thyroxine
- Calcitonin



## **Gonadotrophin hormone –**

Two Gonadotrophin hormone release in response of GnRH i.e. LH and FSH.

LH acts with FSH to perform various functions.

Causes estrogen production increase and ovulation.

Stimulate the formation of the corpus luteum and its production of progesterone.

Stimulate the interstitial cells of the testes to secrete testosterone.



## Growth hormone-

- GH speeds up the movement of amino acids out of the blood and into cells to promote anabolism of amino acids into tissue Proteins.
- Hyper secretion of insulin produces hypoglycemia.
- Hyper secretion of GH produces hyperglycemia.
- Prolactin- PRL or lactogenic hormone.
- Stimulate the development of the breasts for producing milk during pregnancy.

## Posterior pituitary

Two groups of neurons make the posterior gland hormones and pass them along axons to the neurohypophysis. Release is controlled by nervous stimulation.

ADH: Accelerates the reabsorption of water from urine in the kidneys back into the blood.

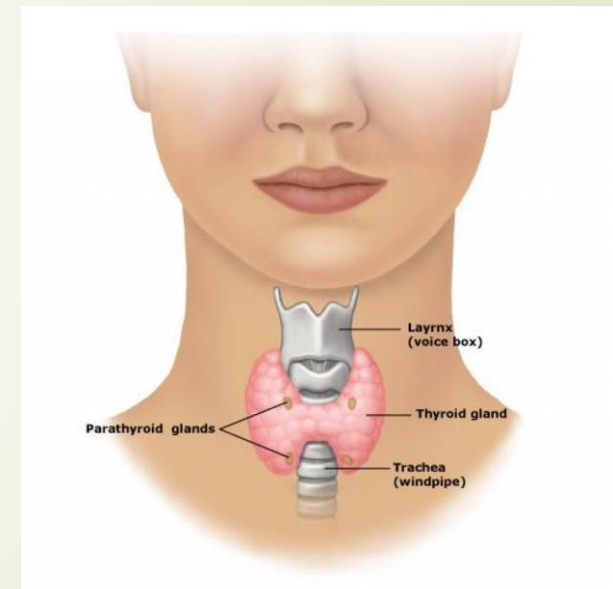
Oxytocin therapy: Is secreted by the posterior pituitary of a female before and after she has a baby.

OT: stimulate uterine contractions to initiate and maintain labor.

## Thyroid Gland

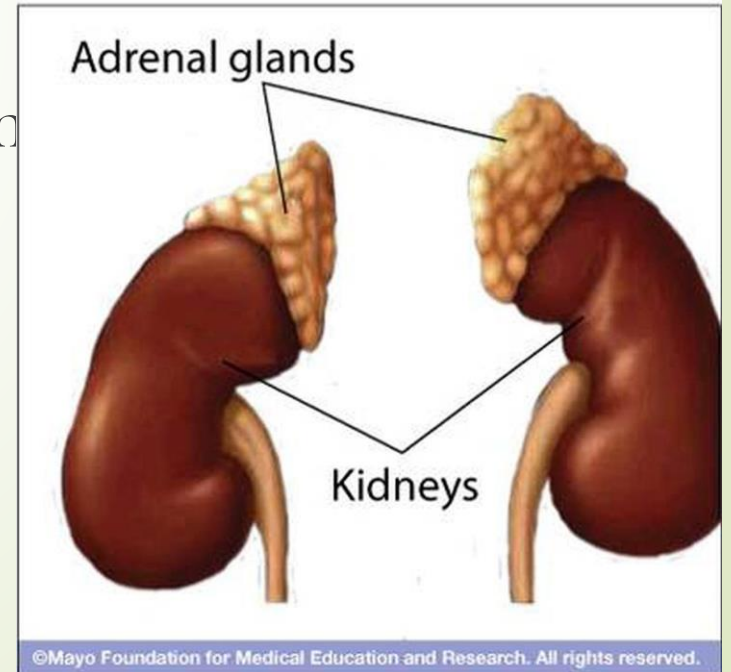
The thyroid gland plays a significant role in controlling our metabolism and ensuring overall health. The thyroid gland is situated in the front portion of the neck, below the larynx.

- The primary function of the thyroid is to control metabolism, or our body's capacity to digest food and convert it into energy.
- The hypothalamus releases Thyrotropin-releasing hormone (TRH) when thyroid hormone levels are too low, alerting the pituitary to create thyroid stimulating hormone (TSH).



## Adrenal Glands

- ▶ Two triangular-shaped glands called the adrenal glands are found on top of each kidney. The outer adrenal cortex and the inner adrenal medulla are the two components that comprise each adrenal gland.
- ▶ The functions of the adrenal cortex and adrenal medulla are highly dissimilar. In response to stress, these glands release hormones that control the salt and water balance of the body, blood pressure, and glucose metabolism.
- ▶ The adrenal glands produce the following hormones
  - ▶ Glucocorticoids, including cortisol
  - ▶ Mineralocorticoids
  - ▶ Adrenal androgens
  - ▶ Catecholamines.

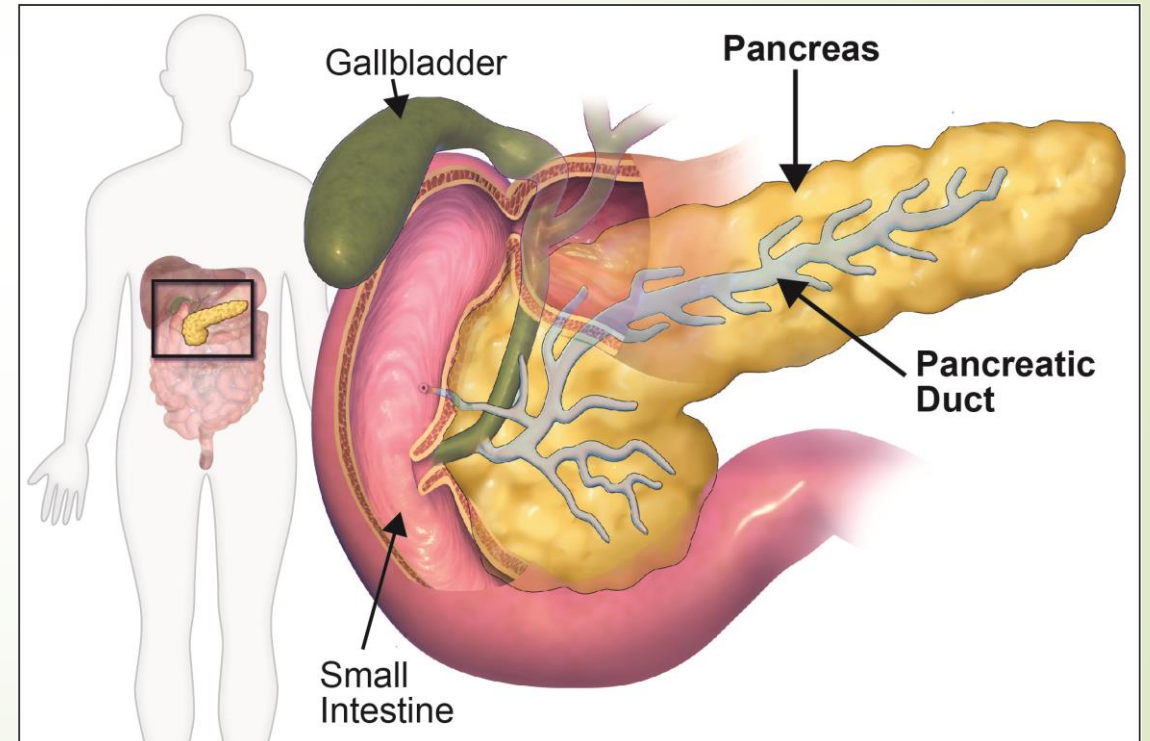




# Pancreas

The pancreas is an abdominal gland organ. The primary purpose of the pancreas is to regulate blood sugar levels in a normal range.

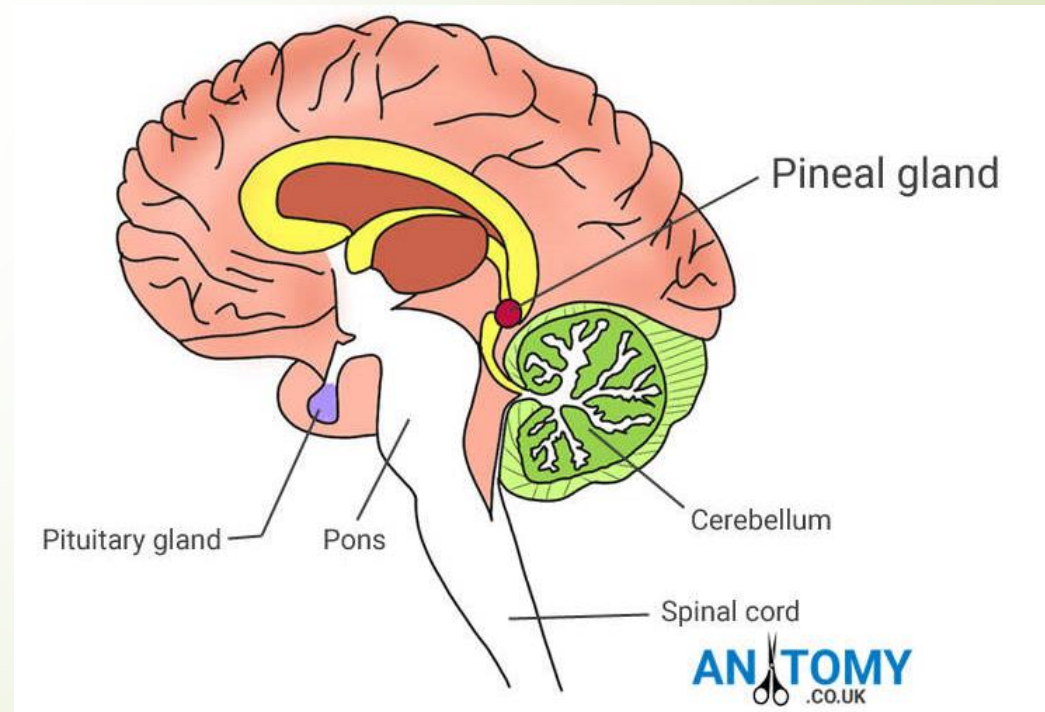
- ▶ The primary pancreatic hormones that control blood glucose are insulin and glucagon.
- ▶ The balance of sugar and salt in our bodies is maintained by synthesizing pancreatic hormones such as insulin, somatostatin, and glucagon.



# Pineal Gland

- The pineal gland, located deep inside the brain. Melatonin is produced by the pineal gland and helps regulate reproductive hormones and circadian rhythm.
- Melatonin is the only hormone secreted by the pineal gland (not the pigment melanin). This basic hormone

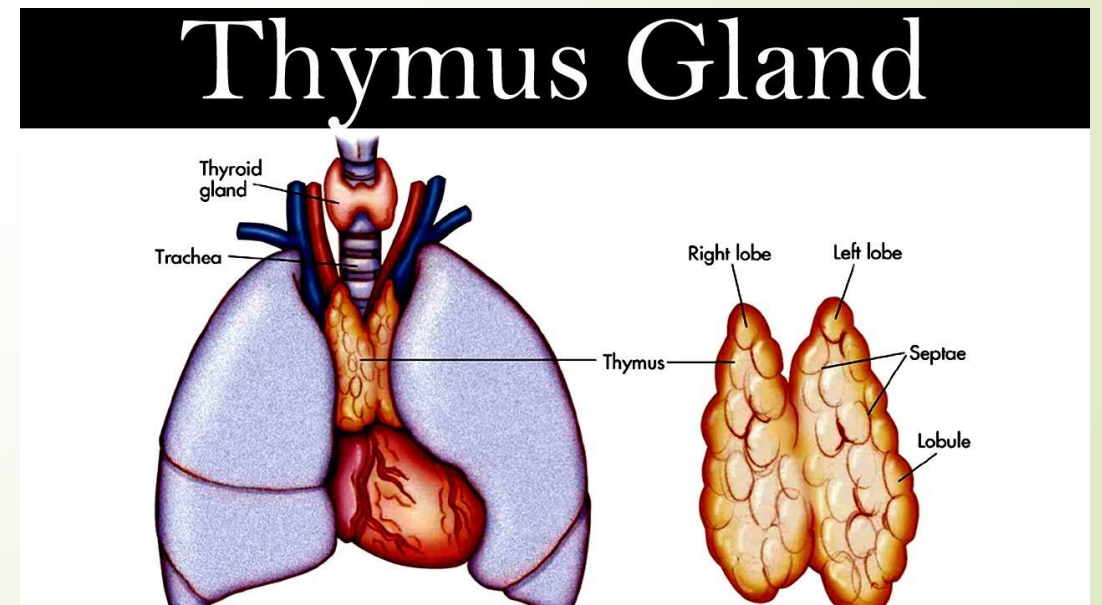
is unique in that light controls its secretion. Melatonin helps to regulate specific reproductive hormones and the circadian or biological clock, its two main functions in humans.





# Thymus Gland

- The thymus gland is a secretory gland that has an important role in immune function. One of its main secretions is the hormone thymosin.
- Thymosin stimulates the maturation of T cells, which are derivatives of white blood cells that circulate our system.





# CONCLUSION

The endocrine system is responsible for hormonal secretion and is closely related to the central nervous system.

It controls physiological processes and maintains homeostasis.

The neuroendocrine system is responsible for adaptation to environmental changes.



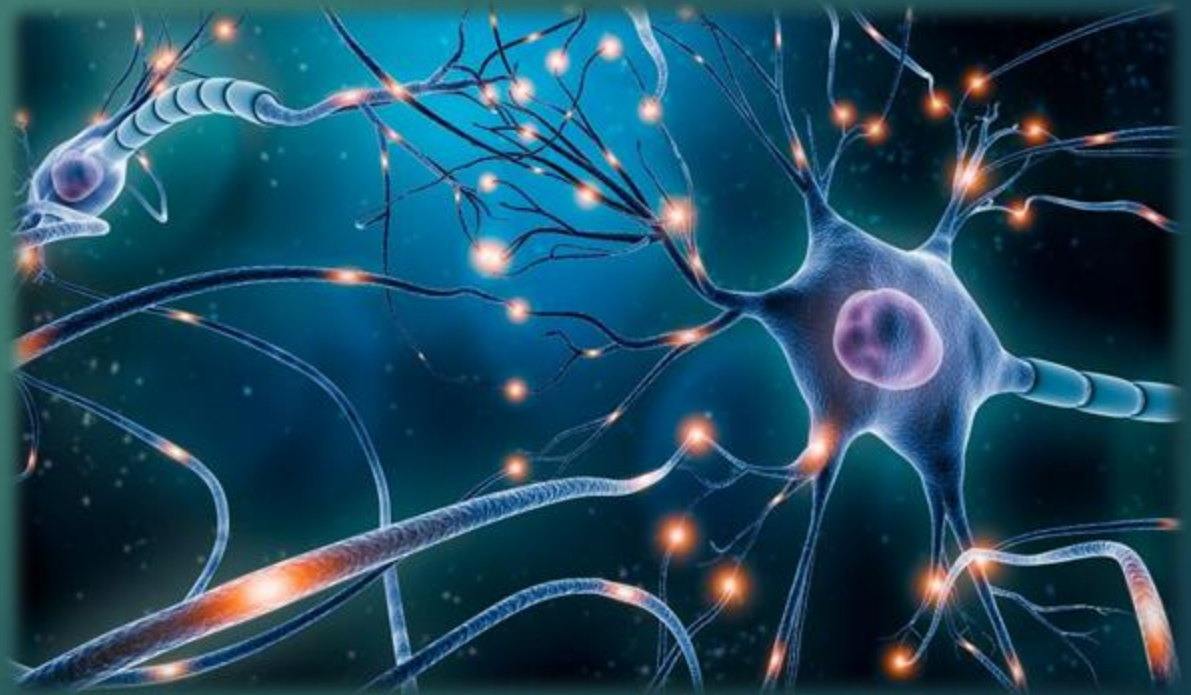
# Reference

- ▶ Anatomy and physiology of Endocrine system Slideshare  
by - Pallavi Pathania  
NCERT Text book

# NERVOUS SYSTEM :

# ANATOMY AND FUNCTIONS

Name : Shruti Kamble  
September. : Food processing  
and Nutrition  
Karnataka State Akkamahadevi  
Women's University, Bijapur





# CONTENT

- ▶ INTRODUCTION
- ▶ STRUCTURE
- ▶ FUNCTIONS
- ▶ NERVOUS SYSTEM TYPES



# INTRODUCTION

The nervous system is the master controlling and communicating system of the body. Every thought, action and emotion reflects its affect. It's signaling device, or means of communicating with body cells, is electrical impulses, which are rapid and specific which cause almost immediate response.

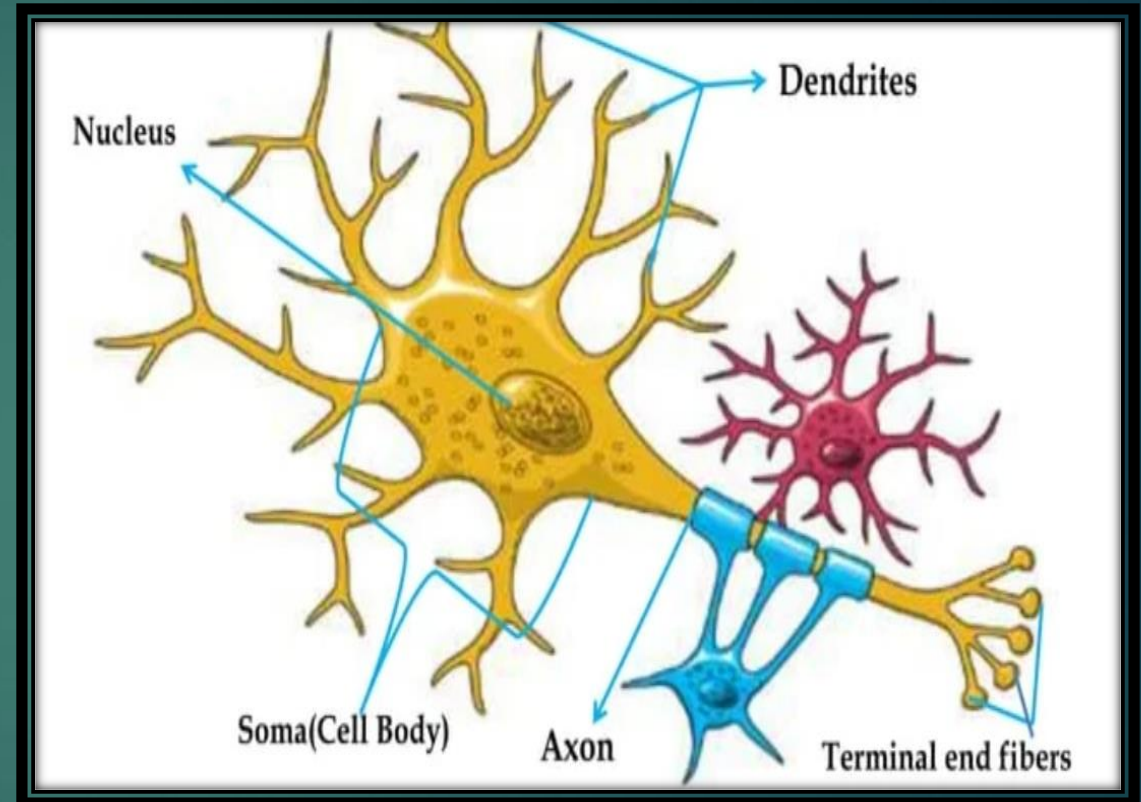


# NEURONS

Neurons (neuron cell) are the basic elements of the Nervous system.

- ▶ **Cell body** : The main processing centre of the cell.
- ▶ **Dendrites** : Thin branching extensions of the cell body that conduct nerve impulse towards the cell body.
- ▶ **Axons** : A single branch which conduct nerve cell away from the cell body.

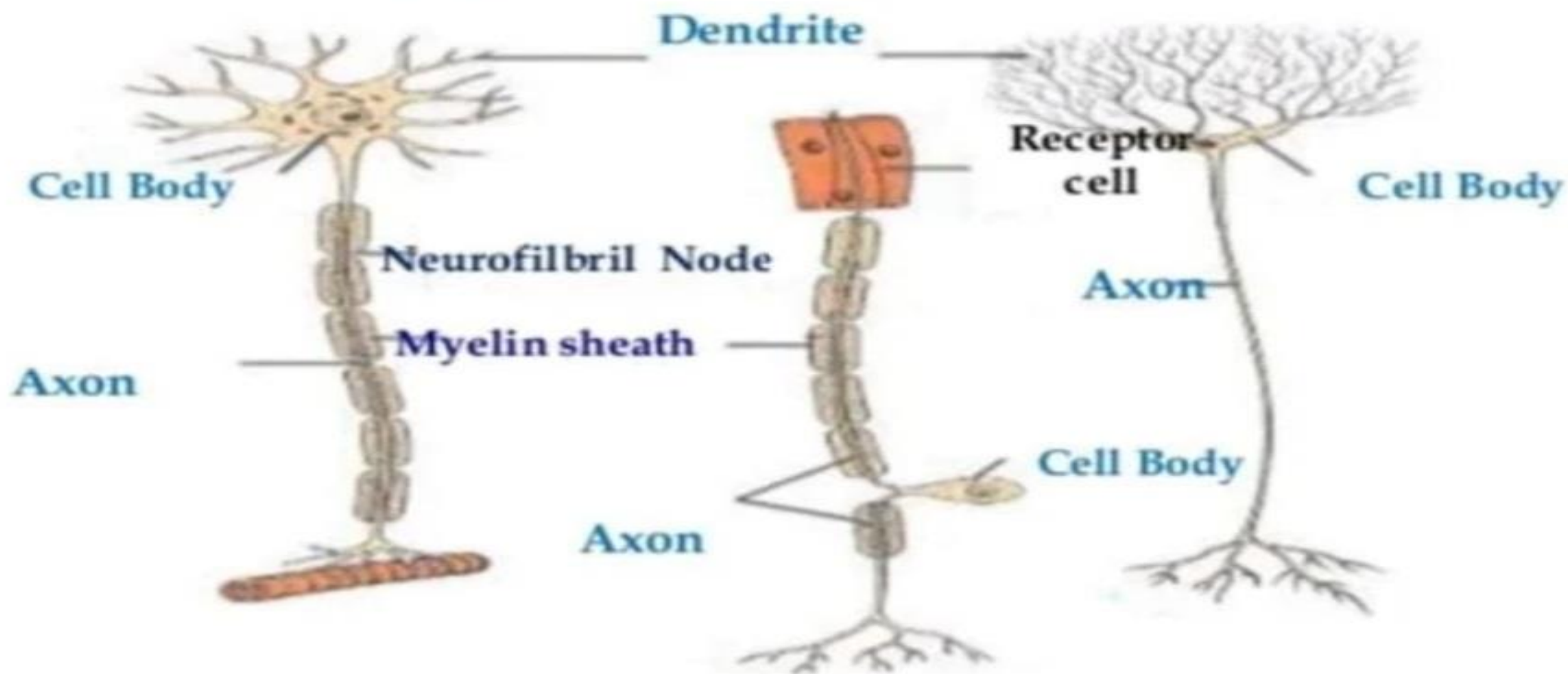
**Myelin sheath** and neurilemma are the coverings.



# Neuron cell

- ▶ The brain and spinal cord are made up of many cells, including neurons and glial cells. Neurons are cells that send receive electro-chemical signal from the brain and nervous system. These are about 100 billion neurons in the brain. There are many more glial cells, they provide support function for the neurons and are far more numerous than neurons.
- ▶ **THREE TYPE OF NEURONS**
  1. Efferent (motor) : Conveys information from the CNS to muscles and glands.
  2. Afferent (sensory) : Carry information from sensory receptor to the CNS.
  3. Interneuron : Carry and process sensory information.

# Types of Neurons



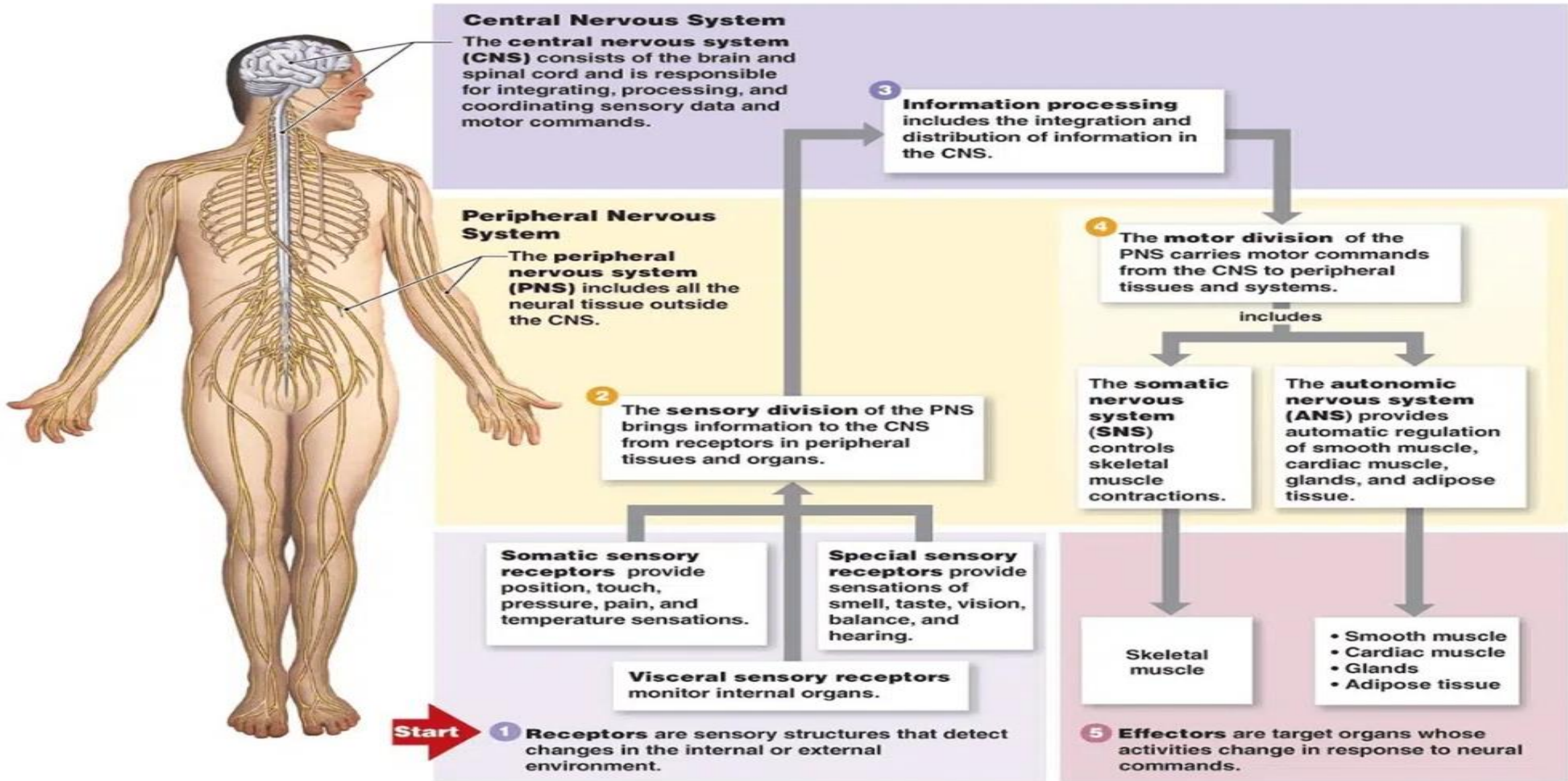
**(i) Efferent (motor) neuron**

**(ii) Afferent (sensory) neuron**

**(iii) Interneuron**



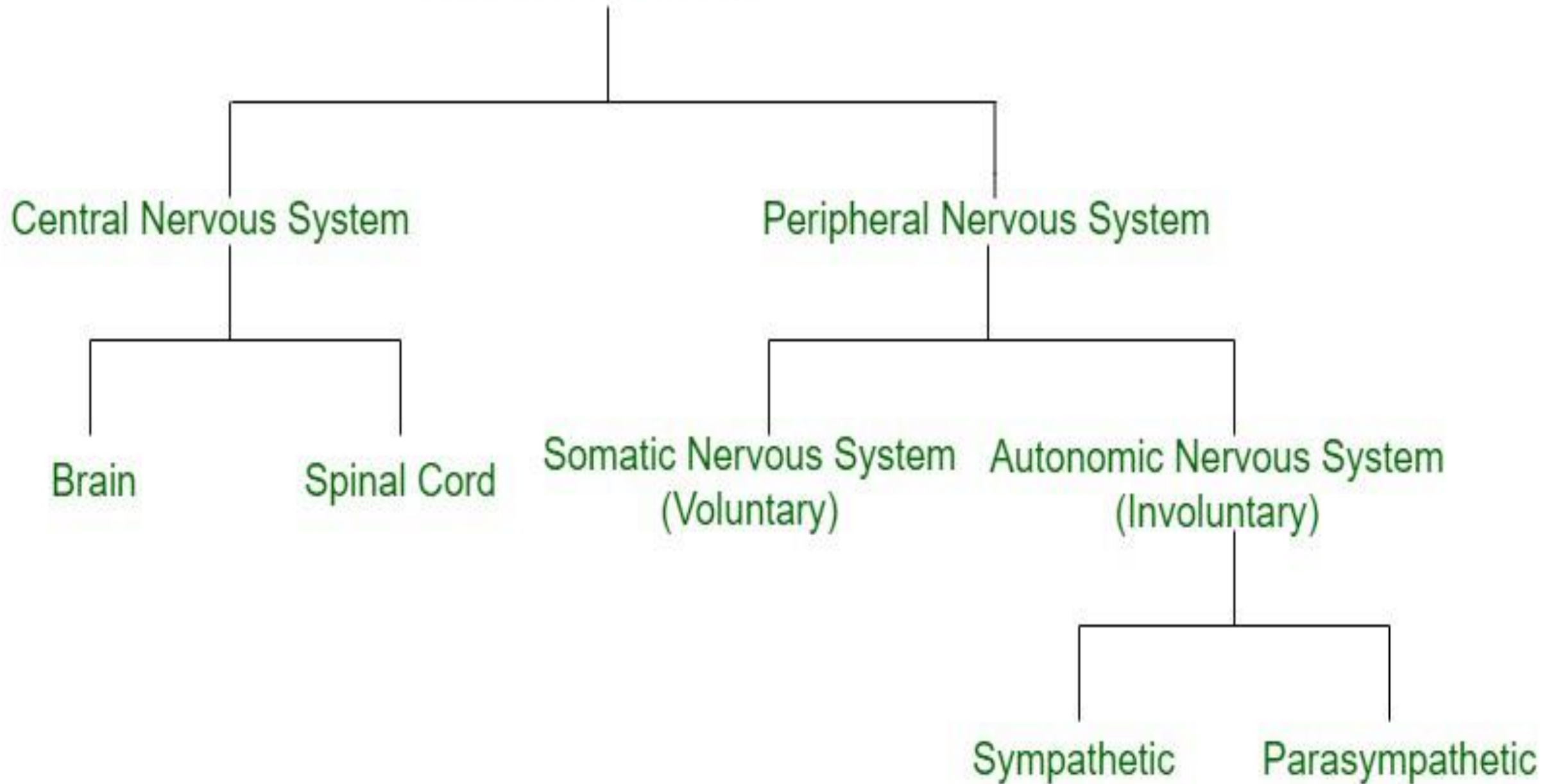
# Nervous System



# FUNCTIONS OF NEURONS SYSTEM

- ▶ **Monitoring changes** : It uses its millions of sensory receptors to monitor, changes occur both inside and outside of the body, these changes are called stimuli and the gathered information is called sensory input.
- ▶ **Interpretation of sensory input** : It processes and interprets the sensory input and decides what should be done in each moment which the process is called integration.
- ▶ **Mental Activity** : The brain is the center of mental activity, including consciousness, thinking and memory.
- ▶ **Homeostasis** : This function depends on the ability of the nervous system to detect, interpret and respond to changes in internal and external conditions.

# Nervous System



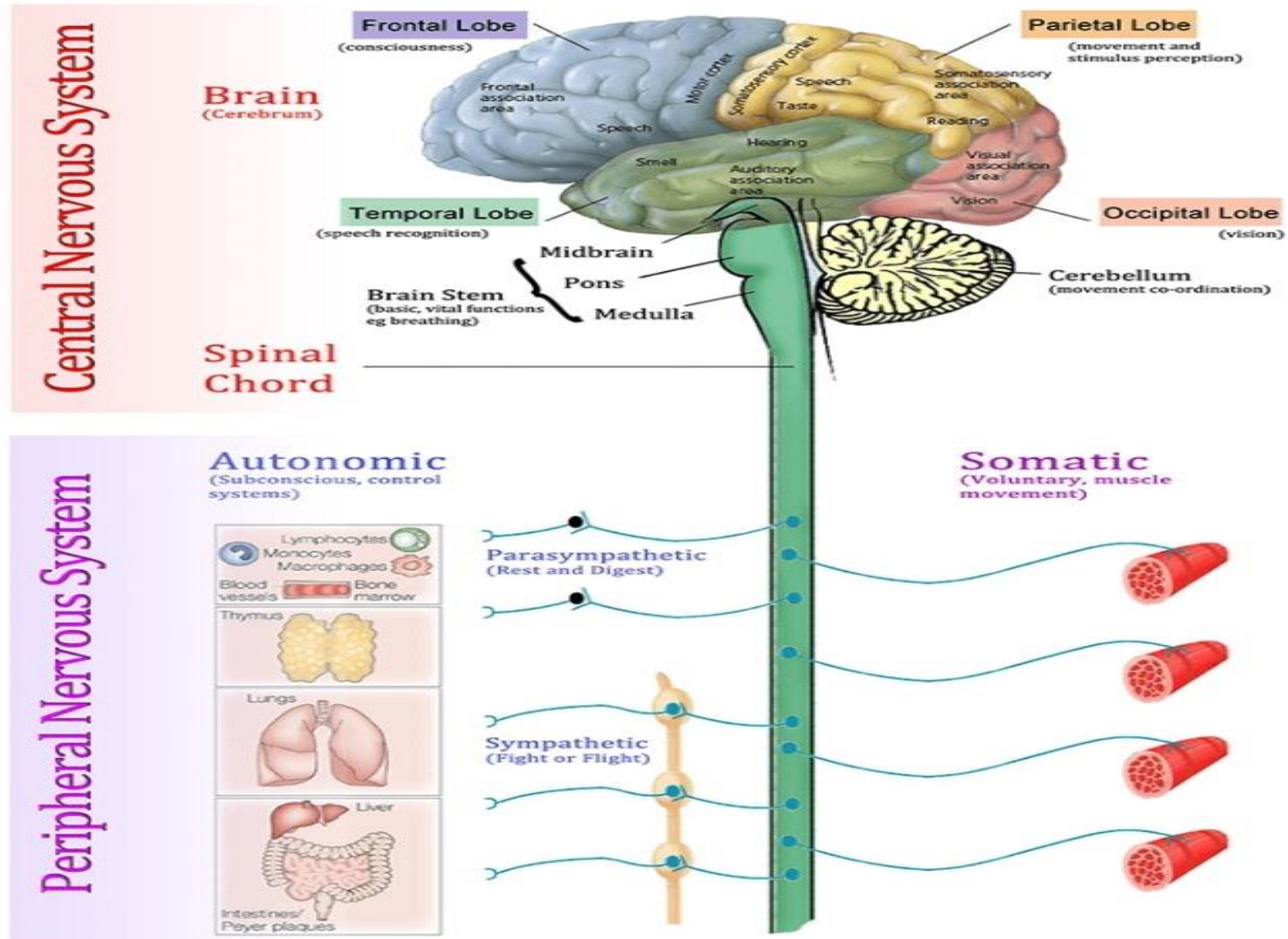


# STRUCTURAL CLASSIFICATION

**Central nervous system (CNS)** : The CNS consists of brain and spinal cord, which occupy the dorsal body cavity and act as the integrating and command centres of the nervous system.

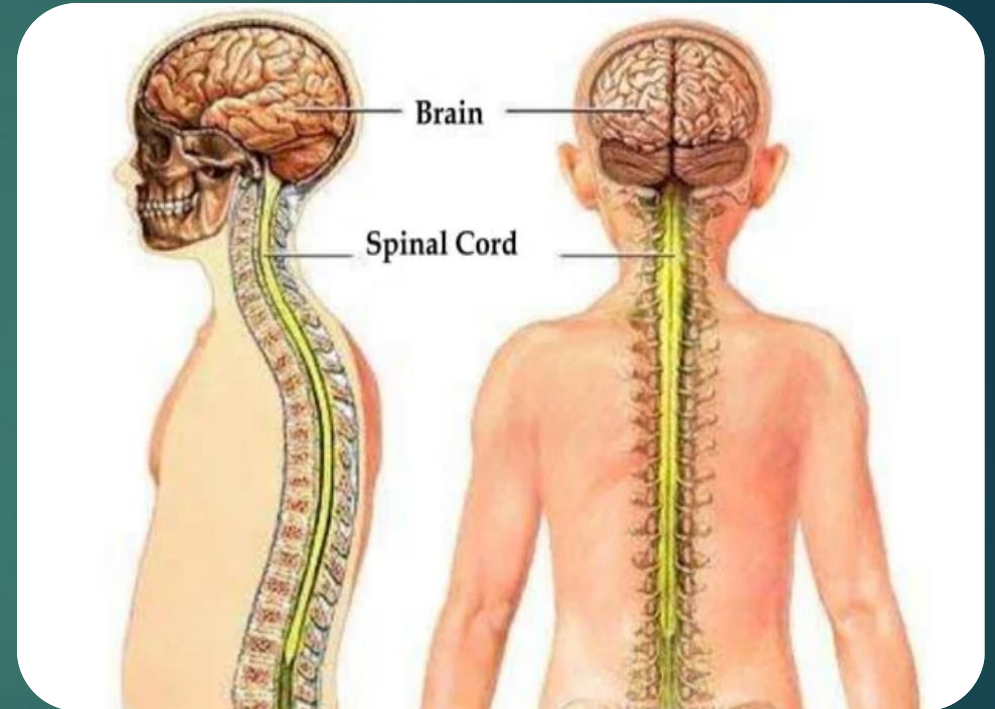
**Peripheral nervous system (PNS)** : The PNS the part of the nervous system outside the CNS, consists mainly of the nervous that extend from the brain and spinal cord.

# Central and Peripheral Nervous System



# CENTRAL NERVOUS SYSTEM

- ▶ The central nervous system is composed of two major components they are
  1. Brain
  2. Spinal cord
- ▶ These organs work together to integrate, coordinate with sensory and motor information for the purpose of controlling the various tissues, organs and organs system of the body.
- ▶ The central nervous system is responsible higher for the neural function such as memory, learning and emotion.

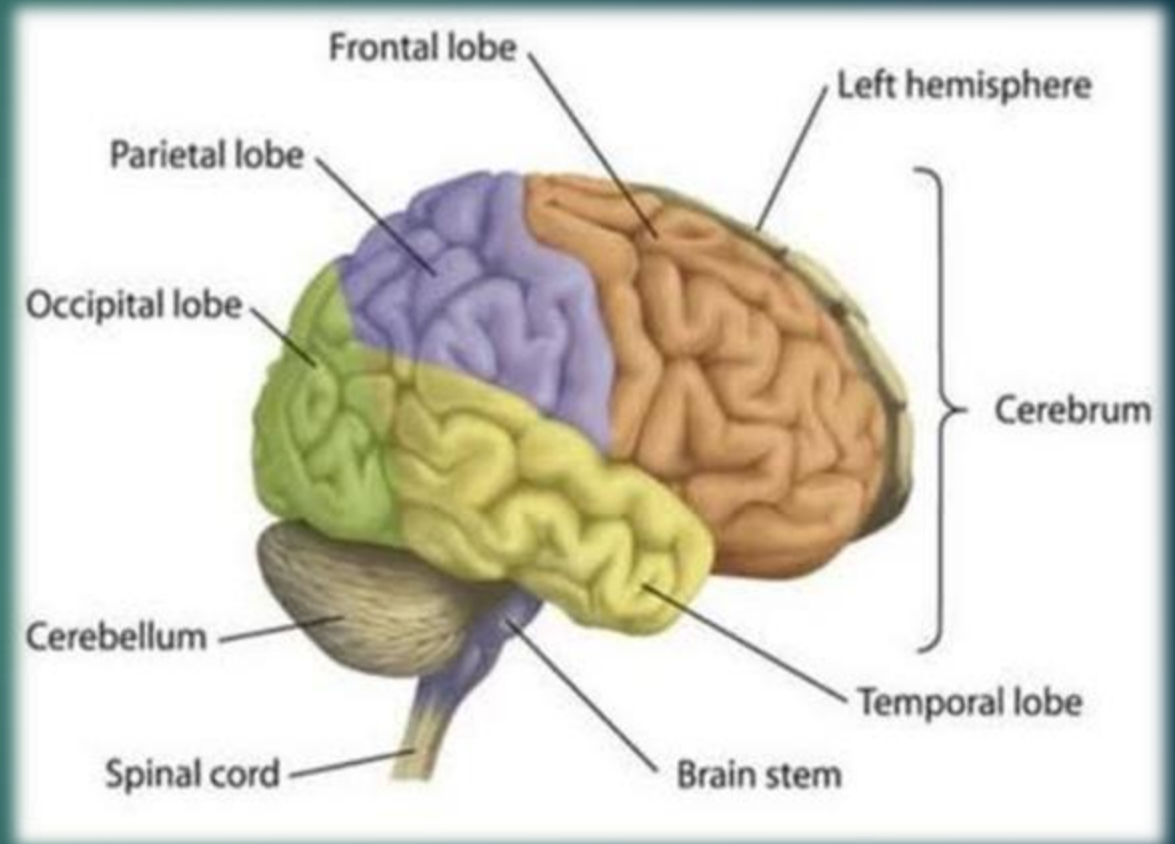


# BRAIN

- ▶ Weighs about 3 pounds in adults.
- ▶ 75% of water
- ▶ 20% of oxygen
- ▶ Contains over 100 billions of neurons.
- ▶ Controls bodily function and interaction with outside world.

## FOUR PARTS:

1. Brainstem
2. Cerebellum
3. Cerebrum
4. Diencephalon





☆ **BRAINSTEM**: Made up of midbrain, pons and the medulla oblongata.

▶ Midbrain : Involved with visual reflexes.

▶ Pons : ● Located between the midbrain and the medulla oblongata.  
● Controls certain respiratory functions.

▶ Medulla oblongata : Contains centres that regulate heart and lungs functioning, swallowing, vomiting, sneezing and coughing.

☆ **CEREBELLUM**

● Area that coordinates musculoskeletal movement to maintain posture, balance and muscle tone.

● Inferior to the occipital lobes of the cerebrum.

● Posterior to the pons and medulla oblongata.

☆ **CEREBRUM** : Located above the Cerebellum.

● Contains two hemisphere with an outer portion called cerebral cortex.

● The two hemisphere are connected by a bridge of nerve fibers that relay information between the two hemisphere called as corpus callosum.

# SPINAL CORD

- ▶ Extended from the medulla oblongata of the brain to the area around the first lumbar vertebra of the lower back.
- ▶ Nerves from the peripheral nervous system extend out from the spinal cord.
- ▶ Protected by :
  - Vertebral columns
  - Cerebrospinal fluid
  - Meninges
- ▶ Meninges are three layers of membranes that cover the brain and spinal cord.
  1. Dura mater : Outer tough fibrous membrane.
  2. Arachnoid mater : Middle weblike membrane containing CSF.
  3. Pia mater : Innermost layer containing several blood vessels.



# PERIPHERAL NERVOUS SYSTEM

- ▶ The peripheral nervous system is a collection of peripheral nervous, ganglia and specialized sensory structures that as a system carries sensory and motor information between the central nervous system and all other organs and tissues of the body.
- ▶ The peripheral nervous system is divided into two majors :
  - ☆ **The somatic nervous system :**
    - Controls voluntary actions.
    - Made up of the cardinal and spinal nervous that go from the central nervous system to skeletal muscle.
  - ☆ **The autonomic nervous system :** Controls involuntary actions those not under conscious control such as heart rate, breathing, digestion and glandular function. Further autonomic nervous system is divided in two that are:
    1. Sympathetic
    2. Parasympathetic

THANK YOU