

Assignment Of:-

Subject: Physiological Psychology

Topic: Central Nervous System (CNS)

Submitted To:-

Mam Fatima Bukhari

Submitted By:-

Roll NO.

<u>Muzamil Yaseen</u>	33
<u>Mirza M. Yasir</u>	07
<u>Ghazia Bashir</u>	34
<u>Taviba Miraj</u>	16
<u>Bisma Anwar</u>	22
<u>Ramsha Arshad</u>	27
<u>Rifat Magsood</u>	24
<u>Rabia Khanum</u>	39

Semester:-

MSc 2nd (Morning)

Department:-

Applied Psychology



Central Nervous System(CNS)

“The central nervous system (CNS) is comprised of brain and spinal cord.

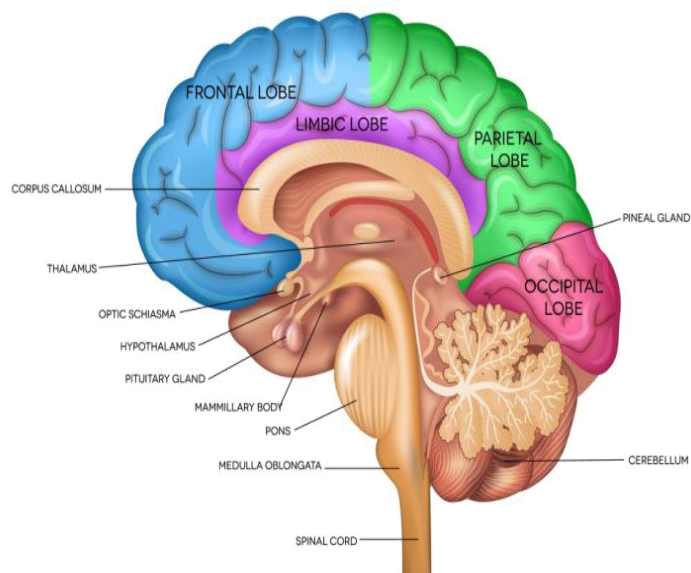
The CNS receives sensory information from the nervous system and controls the body’s responses.”

1. Brain
2. Spinal Cord

Brain

- Brain is the most complex organ in human body. The portion of the CNS that is located within the skull.

ANATOMY OF THE BRAIN



- Weight about 3 pounds in adults
- 75% water

- 20% of oxygen
- Contains more than 100 billion neurons
- Some of its main functions include :
 - Processing sensory information
 - Regulating blood pressure in breathing
 - Releasing hormones etc
- **Parts:** Three Parts Of Brain:

1. **Forebrain:**

It is the largest part of the brain. Forebrain is further divided into following parts:

- **Cerebral Cortex:**

- ✓ Cortex means outer breaks or covering. The cerebral cortex is also called cerebrum.
 - ✓ It is our centre for processing and storing information about the world.
 - ✓ It is the largest part of the forebrain.
 - ✓ Highest mental functions such as thinking and planning take place here. It covers the lower portion of the brain like a larger cap.
 - ✓ It is highly connected with other parts of the brain.
 - ✓ Cerebrum cortex is divided into two halves called hemisphere.
 - ✓ The two hemispheres are connected by a bridge of nerve fibres that relay information between two hemispheres called corpus callosum.
- i. Left Hemisphere
 - ii. Right Hemisphere

Left Hemisphere

- Analytical thought
- Detail Oriented Perception
- Ordered Sequencing
- Relational Thoughts
- Verbal
- Cautious
- Planning
- Logic
- Right field Vision
- Right Side Motor Skills

Right Hemisphere

- Intuitive Thought
- Holistic perception
- Random sequencing
- Emotional Thoughts
- Non Verbal
- Adventurous
- Impulse
- Imagination
- Left field Vision
- Left side motor Skills

Lobes:-

Each Hemisphere has four major divisions called lobes, which are given below:

i. Frontal Lobe:-

- It is located at the front part of the brain and covers the largest area.
- It performs following function
 - ✓ Thinking
 - ✓ Planning
 - ✓ Problem Solving
 - ✓ Emotions
 - ✓ Decision making

ii. Temporal Lobe:-

- Temporal Lobes are located at the temple within each side of the brain.
- It performs following functions
 - ✓ Memory
 - ✓ Understanding language
 - ✓ Recognition
 - ✓ Behavioral Control
 - ✓ Hearing vision
 - ✓ Speech
 - ✓ Emotions

iii. Parietal Lobe:

- Parietal lobes are wedged in behind the frontal lobe and above the occipital and temporal lobes.
- It performs following functions
 - ✓ Perception
 - ✓ Object classification
 - ✓ Spelling
 - ✓ Knowledge of numbers
 - ✓ Visuospatial processing

iv. Occipital Lobe:-

- Occipital lobes are located at the very back of the brain.
- It performs following functions
 - ✓ Vision and visual processing
 - ✓ Color identification

Areas of cortex:

There are three major areas of cortex;

a) Sensory Area:-

It receives information from senses. The sense which is activated deals with its own sensory area.

The large areas of cerebral cortex are involved with vision and hearing. Entire occipital lobe process visual information and auditory impulses end up in large centers in temporal lobes.

b) Motor Area:-

Some of our actions originate below the cerebral cortex. Most voluntary activity originates in the motor area of the cerebral cortex at very back of our frontal lobes.

c) Associative Areas:-

Higher mental processes occur in associative areas. After sensory and motor areas, the remaining area is called associative area.

Sensory input is associated with motor responses occur here. Cognitive functions such as problem solving, remembering, and thinking also occur here.

There are associative areas in each hemisphere: Frontal, Parietal, Temporal.

❖ Thalamus:

- ✓ It is positioned right below the cerebral cortex and is ultimately involved with its functioning.

Functions:

- ✓ Major role of thalamus is to process information from the senses.
- ✓ Thalamus collects and directs sensory messages to the appropriate areas of the cerebral cortex.
- ✓ Messages from our lower body, our eyes, ears, and other senses pass through the thalamus.
- ✓ It also involved in normal pattern of wakefulness and sleep.

❖ Hypothalamus:

- ✓ The hypothalamus is located near the limbic system.

Functions:

- ✓ It is involved in our innovational and emotional reactions.
- ✓ Its major responsibility is to monitor critical internal body functions.
- ✓ It controls eating behavior and is sensitive to the amount of fluid in our body.
- ✓ The hypothalamus also acts as a thermostat.
- ✓ It also influences many functions of endocrine system.
- ✓ It also involved in aggressive and sexual behaviours and regulate many hormones.

❖ Limbic System:

- ✓ The limbic system is a collection of structures rather than a single one.
- ✓ It controls many complex behavior patterns. limbic system is important in both memory and emotion.
- ✓ Its two major principles are; Amygdala and hippocampus.

✓ Amygdala:

- The word amygdala derived from Latin meaning "almond shape".

- Amygdala is located with base of temporal lobe. Amygdala is involved in the description of objects.
- It is also involved in emotional awareness and expressions through its many connections with higher and lower regions of the brain.
- Amygdala also produces reaction of rage and aggression when stimulated.

✓ **Hippocampus:**

- Hippocampus is also a part of limbic system.
- It is involved in formation of memories.
- People with damaged hippocampus are unable to remember for short periods of time.
- It has a special role in storage of memory.

2. **Mid Brain:**

- It is associated between forebrain and hindbrain.
- Many nerve fibres are ascend and decend to connect the higher and lower portions of the brain.
- The midbrain relays information between the brain and the eyes and ears.
- The ability to attend to an object visually is linked to one bundle of neurons in the midbrain.

3. **Hind Brain:**

Hind Brain is the lowest part of the brain.

Parts :Hindbrain has parts are given below:

CEREBELLUM:

- ✓ **Meaning:** It is Latin mean “little brain”.
- ✓ **Position:** It is located at the back side of head.
- ✓ **Functions:** It controls the balance of the body.
It coordinates the voluntary movement of the body.

Pons:

- ✓ **Meaning:** Pons mean “Bridge”.
- ✓ **Position:**It is located above the medulla.
- ✓ **Functions:**It controls sleep as well as the rate and pattern of breathing.

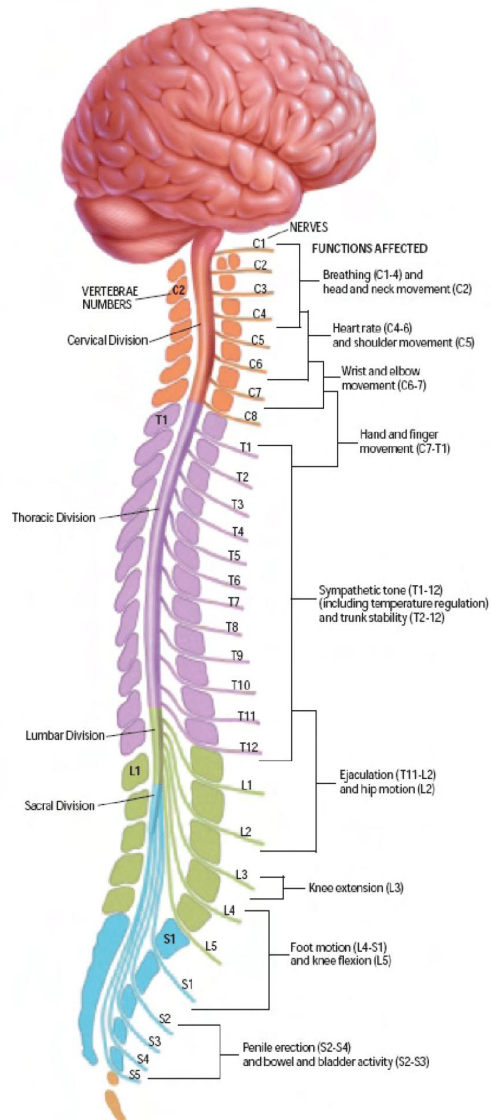
Medulla:

- ✓ **Position:**It is posterior part of the part.
- ✓ **Functions:** It control automatic actions e.g
 - a. Breathing
 - b. Heart rate

- c. Swallowing
- d. Blood circulation

Spinal Cord

- ✓ The main pathway for information connecting the brain and peripheral nervous system.
 - ✓ It is elongated, cylindrical, suspended in the vertebral canal and protected by vertebrae.
 - ✓ Surrounded by the meninges and cerebrospinal fluid(CSF).
 - ✓ It begins from medulla oblongata just below the foramen magnum and ends between 1st and 2nd lumbar vertebrae.
 - ✓ Gives rise to 31 pairs of spinal nerves.
-
- 8 Cervical
 - 12 thoracic
 - 5 Lumbar
 - 5 Sacral
 - 1 Coccygeal



Functions:

Two important functions of Spinal cord :

- ❖ Common passageway for ascending and descending tracts. Neurons in the white matter of spinal cord transmit sensory signals from peripheral regions to the brain and motor signals from brain to peripheral regions.
- ❖ **Center for reflexes:** Neurons in the gray matter of the spinal cord integrate incoming sensory information and respond with motor impulses that control muscles or glands.

Cross Section of the Spinal Cord:

- ✓ **Gray Matter:** The gray matter is the dark, butterfly-shaped region of the spinal cord made up of nerve cell bodies.
- ✓ **White Matter:** The white matter surrounds the gray matter in the spinal cord and contains cells coated in myelin, which makes nerve transmission occur more quickly. Nerve cells in the gray matter are not as heavily coated with myelin.

Tracts of Spinal Cord:

Two tracts of spinal cord :

- Ascending Tracts: They carry information from the body organ to the brain.
- Descending Tracts: They carry motor information from brain to muscles and glands.

Meninges:

The brain and spinal cord are surrounded by membrane that is called meninges.

Layers of Meninges:-

Three layer of meninges:

- ✓ **Dura Matter:** It is outer and tough fibrous membrane layer.
- ✓ **Arachnoid Matter:** It is middle weblike membrane containing CSF.
- ✓ **Pia Matter:** It is innermost layer containing several blood vessels.

THANK YOU !

Refferences:

Neil R. Carlson. (2006). Foundations of Physiological Psychology: Structure of the Nervous System, (7th ed). *University of Massachusett, Amherst.*

Rakhshanda Shahnaz. (2010). An Approach to Psychology: Nervous System, (Vol.1). *Carvan Book House, Lahore.*