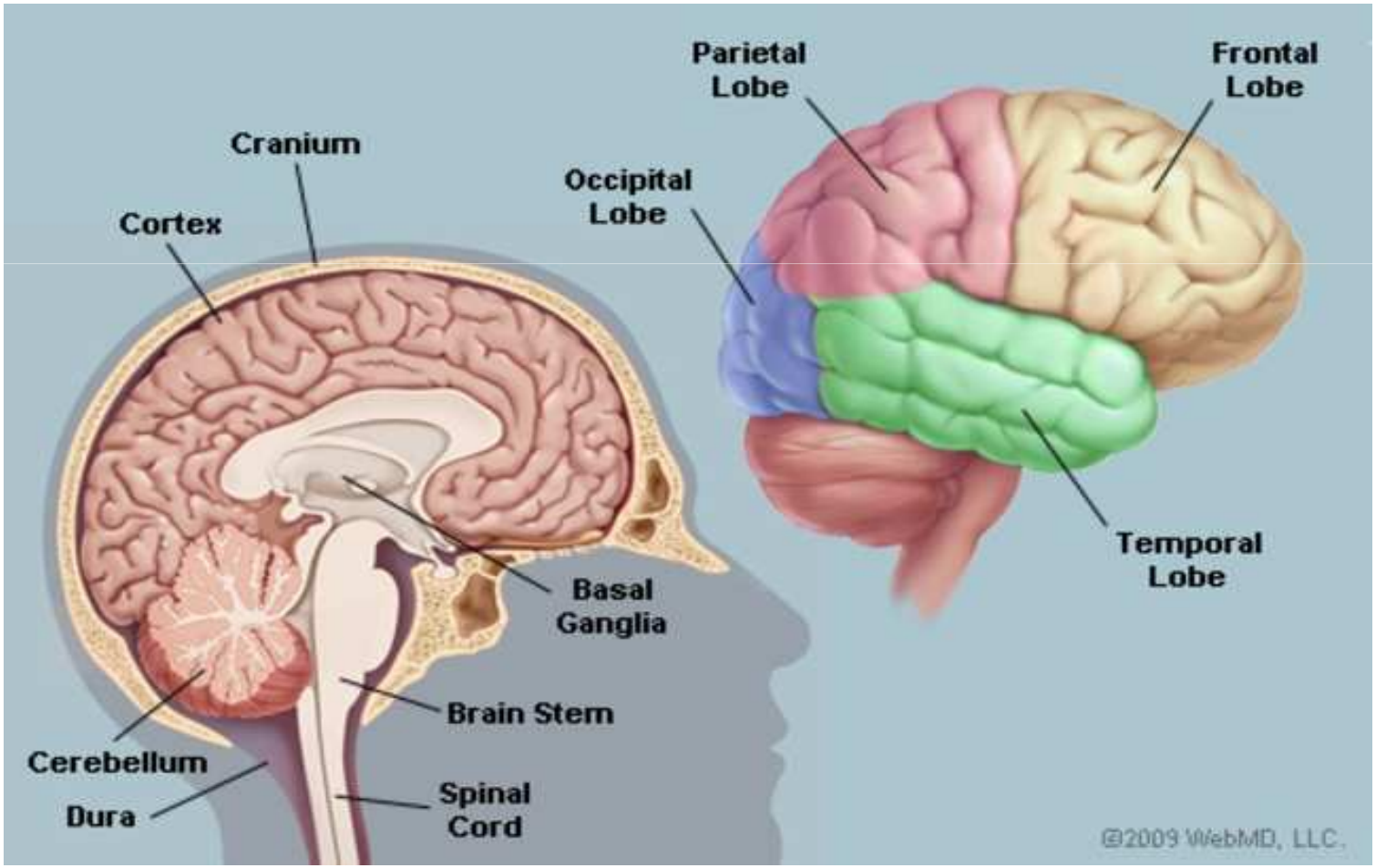
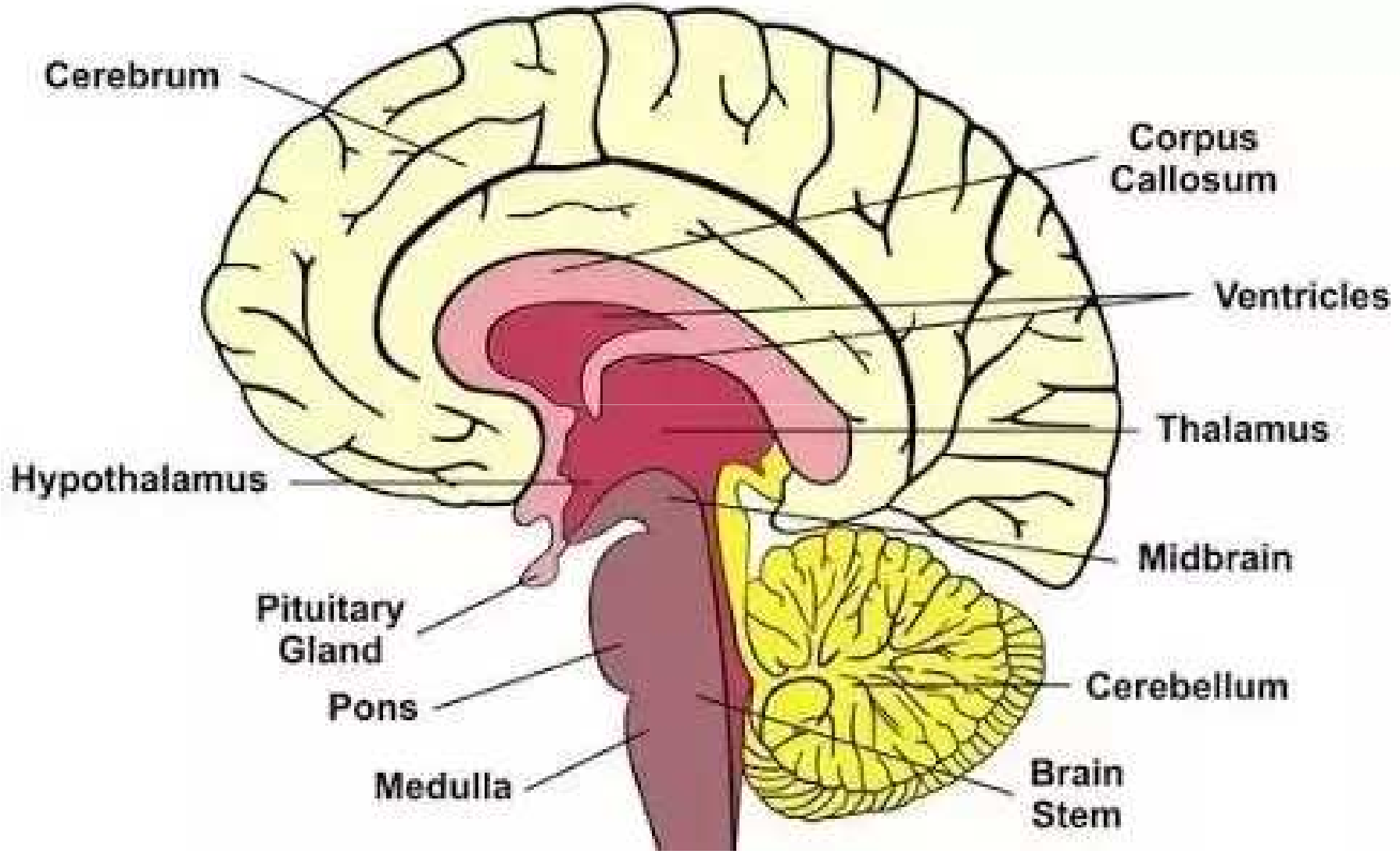
CLASS X/ BIOLOGY

CONTROL AND COORDINATION

Date : 08/07/2020 **TEACHER :SASWATI BASAK**

Central Nervous System: Human Brain




Cerebrum
Corpus Callosum
Ventricles
Thalamus
Hypothalamus
Midbrain
Pituitary Gland
Pons
Cerebellum
Medulla
Brain Stem

Central Nervous System control and regulates the voluntary actions.

- Brain and spinal cord are enclosed within three membrane called **meninges.**
- These are outer thick and tough duramater forming the inner lining cranial cavity, inner thin soft vascular piamater which is closely present with the brain and spinal cord and middle delicate layer arachnoid.

❖Brain and spinal cord are hollow.

❖The cavities of the brain are called **ventricles.**

❖The cavities of two cerebral hemispheres are called **second or lateral ventricles.**

❖Cavity of diencephalon at the base of cerebral is called the **third ventricle.**

❖The cavity between pons, medulla oblongata and the cerebellum is the **fourth ventricle.**

❖All ventricle and canals of the spinal cord are filled with the cerebro spinal fluid. It protects the brain and the spinal cord.

The brain and spinal cord are made up of two types of nervous tissue.

i) **Cortex** – It is outer part of the brain and inner part of the spinal cord. Spinal cord, compose nerve cells, nonmyelinated fibre and blood vessels.

ii) **Medulla** – It is the inner part of the brain and outer part of spinal cord and formed of myelinated nerve fibres and neuroglia.

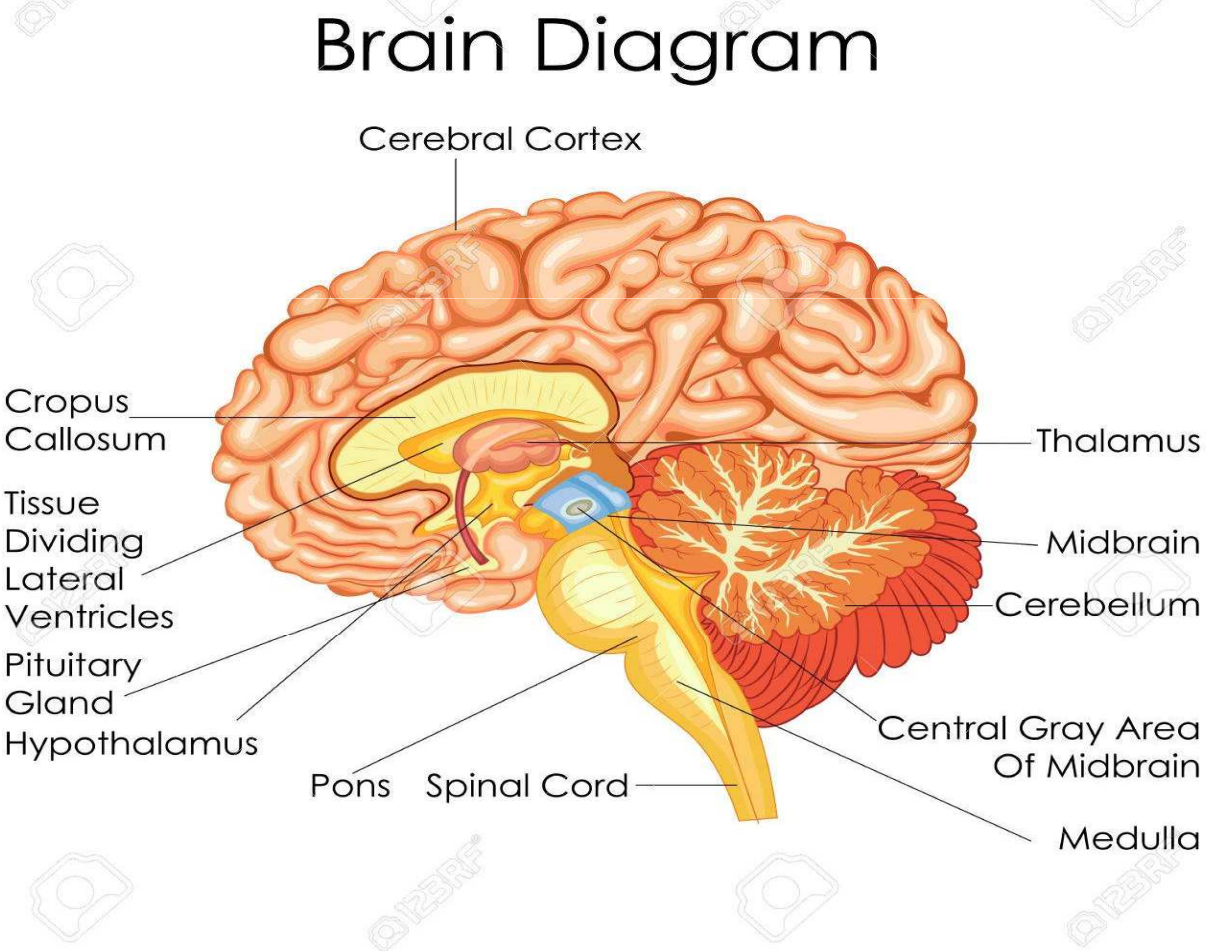
PARTS OF THE BRAIN

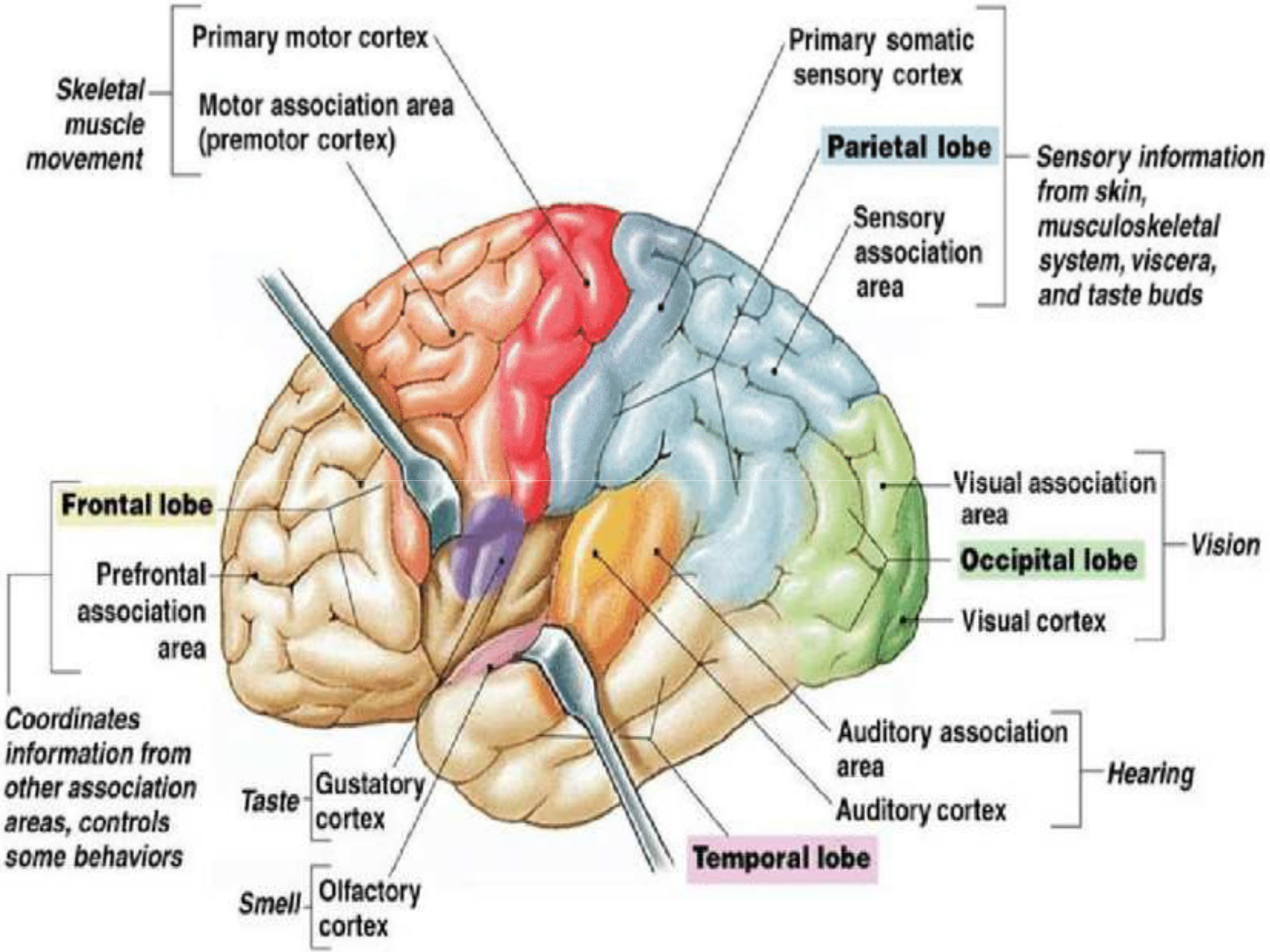
Brain has three regions:

i) **Fore Brain**

ii) **Mid Brain**

iii) **Hind Brain**




Primary motor cortex
Skeletal muscle movement
Motor association area (premotor cortex)
Primary somatic sensory cortex
Parietal lobe
Sensory association area
Sensory information from skin, musculoskeletal system, viscera, and taste buds
Frontal lobe
Prefrontal association area
Coordinates information from other association areas, controls some behaviors
Visual association area
Occipital lobe
Visual cortex
Vision
Taste
Gustatory cortex
Smell
Olfactory cortex
Auditory association area
Auditory cortex
Hearing
Temporal lobe

FORE BRAIN

It includes olfactory lobes, cerebrum or cerebral hemispheres and diencephalon.

i) **Olfactory Lobes** – It is embedded in the anterior most frontal lobe of cerebral hemispheres and is related to olfactory responses i.e. sense of smell.

ii) **Cerebrum** – It is the largest part of the brain and it covers two third parts of the brain. It is divided into two region – left and right cerebral hemispheres by a deep groove. Each hemispheres contains a cavity, right and left lateral ventricle. It contain cerebral cortex which is formed of grey matter covering the surface of the hemispheres. Cortex of cerebrum control muscular movement, interprets sensory impulses and is also concerned with emotion and intelligence.

Cerebrum has

a) Sensory areas where impulses received from sense organs

b) Motor areas from where responses are sent to effector organs

iii) **Diencephalon** – It lies between the upper cerebrum and the lower midbrain. It is differentiated into upper epithalamus and lower hypothalamus.

Epithalamus – It feels sensation of heat, cold, pain.

Hypothalamus – It acts as thermoregulatory centre, it regulate water balance, carbohydrate and fat metabolism and controls feelings of pleasure, anger, fear, hunger, thirst, sleep, wakefulness

MID BRAIN

- It lies below cerebral hemispheres, behind diencephalon and above hind brain.
- The roof of the mid brain serves as visual and auditory reflexes.
- The floor of the mid brain connects cerebral hemispheres with the hind brain and spinal cord.
- These are centre for integration of impulses for the performance of muscular movements.

HIND BRAIN

It includes cerebellum, pons varolii, medulla oblongata.

a) **Cerebellum** – It lies below the cerebrum at the back. Its surface is like that of cerebral hemispheres and its divided in two cerebellar hemispheres. It maintain body equilibrium, posture, muscle coordination and muscle tone.

b) **Pons varolii** – It is formed entirely white matter. It joins various part of the brain with each other. The pons take part in regulating respiration.

HIND BRAIN

c) **Medulla oblongata** – It is the last part of the brain in front of the spinal cord. It contains white matter on the surface and grey matter in the centre like spinal cord. It controls breathing, heart beat, swallowing, vomiting and secretory activities of the digestive tract.

SPINAL CORD

- It runs from medulla oblongata through the central canal of the vertebral column upto the level of first lumbar vertebra.
- The spinal cord roughly cylindrical and divisible into cervical, thoracic, lumbar, sacral and coccygeal parts.
- It gives of 31 pairs spinal nerves.
- It mainly control reflex activities and also transmits impulses to and from the brain.