

Forebrain

It is considered to be the most important part of the brain because it performs all cognitive, emotional, and motor activities. We will discuss four major parts of the forebrain: hypothalamus, thalamus, limbic system, and cerebrum.

Hypothalamus: The hypothalamus is one of the smallest structures in the brain, but plays a vital role in our behavior. It regulates physiological processes involved in emotional and motivational behavior, such as eating, drinking, sleeping, temperature regulation, and sexual arousal. It also regulates and controls the internal environment of the body (e.g., heart rate, blood pressure, temperature) and regulates the secretion of hormones from various endocrine glands.

Thalamus: It consists of an egg-shaped cluster of neurons situated on the ventral (upper) side of the

hypothalamus. It is like a relay station that receives all incoming sensory signals from sense organs and sends them to appropriate parts of the cortex for processing. It also receives all outgoing motor signals coming from the cortex and sends them to appropriate parts of the body.

The limbic system: This system is composed of a group of structures that form part of the old mammalian brain. It helps in maintaining internal homeostasis by regulating body temperature, blood pressure, and blood sugar level. It has close links with the hypothalamus. Besides hypothalamus, the limbic system comprises the hippocampus and Amygdala. The hippocampus plays an important role in long-term memory. The amygdala plays an important role in emotional behavior.

The cerebrum: Also known as Cerebral cortex, this part regulates all higher levels of cognitive functions, such as attention, perception, learning, memory, language behavior, reasoning, and problem

Solving. The cerebrum makes two-third of the total mass of the brain. Its thickness varies from 1.5 mm to 4 mm, which covers the entire surface of the brain and contains neurons, neural nets, and bundles of axons. All these make it possible for us to perform organized actions and create images, symbols, associations, and memories.

The cerebrum is divided into two symmetrical halves, called the cerebral hemispheres. Although the two hemispheres appear identical, functionally one hemisphere usually dominates the other. For example, the left hemisphere usually controls language behavior. The right hemisphere is usually specialised to deal with images, spatial relationships, and pattern recognition. These two hemispheres are connected by a white bundle of myelinated fibers, called Corpus Callosum that carries messages back and forth between the hemispheres.

Cerebral cortex has also been

divided into four lobes - Frontal lobe, Parietal lobe, Temporal lobe, and Occipital lobe.

Frontal lobe - It is mainly concerned with cognitive functions, such as attention, thinking, memory, learning, and reasoning, but it also exerts inhibitory effects on autonomic and emotional responses.

Parietal lobe: It is mainly concerned with cutaneous sensations and their coordination with visual and auditory sensations.

Temporal lobe: It is primarily concerned with the processing of auditory information. Memory for symbolic sounds and words resides here. Understanding of speech and written language depends on this side lobe.

Occipital lobe: It is mainly concerned with visual information. It is believed that interpretation of visual impulses, memory for visual stimuli and colour visual orientation is performed by this lobe.