

Major Structures of the Brain

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Structure	Description	Major Functions
<i>Brainstem</i>	Stemlike portion of the brain, continuous with diencephalon above and spinal cord below. Composed of midbrain, pons, medulla oblongata.	Relays messages between spinal cord and brain, from brainstem cranial nerves to cerebrum. Helps control heart rate, breathing rate, blood pressure. Involved with hearing, taste, other senses.
<i>Cerebellum</i>	Second largest part of the brain. Located behind pons, in posterior section of cranial cavity. Composed of cerebral cortex, two lateral lobes, central flocculonodular lobes, medial vermis, some deep nuclei.	Process center involved with coordination of muscular movements, balance, precision, timing, body positions. Processes sensory information used by motor systems.
<i>Cerebral cortex</i>	Outer layer of cerebrum. Composed of gray matter and arranged in raised ridges (gyri), grooves (sulci), depressions (fissures).	Involved with most conscious activities for living. (See major functions of cerebral lobes.)
<i>Cerebral lobes</i>	Major divisions of cerebrum, consisting of frontal, parietal, temporal, occipital lobes (named for bones under which they lie), insula. Also include limbic lobe .	<ol style="list-style-type: none"> 1. Frontal lobe involved with motor control of voluntary movements, control of emotional expressions and moral behavior. 2. Parietal lobe involved with general senses, taste. 3. Temporal lobe involved with hearing, equilibrium, emotion, memory. 4. Occipital lobe organized for vision and associated forms of expression. Insula may be involved with gastrointestinal and other visceral activities. 5. Limbic lobe (along with the limbic system) is involved with emotions, behavioral expressions, recent memory, smell.
<i>Cerebrum</i>	Largest part of brain. Divided into left and right hemispheres by longitudinal fissure and divided into cerebral lobes. Also contains cerebral cortex (gray matter), white matter, basal ganglia, diencephalon.	Controls voluntary movements, coordinates mental activity. Center for all conscious living.
<i>Corpus callosum</i>	Bridge of nerve fibers that connects one cerebral hemisphere with the other.	Connects cerebral hemispheres, relaying sensory information between them. Allows left and right hemispheres to share information, helps to unify attention.
<i>Hypothalamus</i>	Small mass below the thalamus; forms floor and part of lateral walls of third ventricle.	Highest integrating center for autonomic nervous system. Controls most of endocrine system through its relationship with the pituitary gland. Regulates body temperature, water balance, sleep-wake patterns, food intake, behavioral responses associated with emotion.
<i>Medulla oblongata</i>	Lowermost portion of brainstem. Connects pons and spinal cord. Site of decussation of descending direct corticospinal (motor) tract and an ascending sensory (touch, etc.) pathway from spinal cord to thalamus; emergence of cranial nerves 4 through 7; movement of cerebrospinal fluid from ventricular to subarachnoid space between subarachnoid and pia mater (contains cerebrospinal fluid).	Provide subarachnoid circulatory paths for cerebrospinal fluid, protective cushion
<i>Midbrain</i>	Located at upper end of brainstem. Connects pons, and cerebellum with cerebrum. Site of emergence of cranial nerves 3, 4.	Involved with visual reflexes, movement of eyes, focusing of lens, dilation of pupils.
<i>Pons</i>	Short, bridgelike structure composed of mainly of fibers that connect midbrain and medulla, cerebellar hemispheres, and cerebellum and cerebrum. Lies anterior to cerebellum and between midbrain and medulla. Site of emergence of cranial nerve.	Controls certain respiratory functions. Serves as relay station from medulla to higher structures in brain.

<i>Reticular formation</i>	Complex network of nerve cells organized into ascending (sensory) and descending (motor) pathways. Located throughout core of entire brainstem.	Specific functions for different neurons, including involvement with respiratory and cardiovascular centers, regulation of brain's level of awareness.
<i>Thalamus</i>	Composed of two separate bilateral masses of gray matter. Located in center of cerebrum.	Intermediate relay structure and processing center for all sensory information (except smell) going to cerebrum.