

THE HUMAN BRAIN



The central nervous system determines our personality, memories, thoughts, senses and movements; all the things that make us who we are. It also controls more automatic functions such as control of heartbeat, breathing and blood pressure. The central nervous system is made up of the brain and the spinal cord.

The Brain:

The cerebrum is the largest region of the brain. It is divided into two halves, or hemispheres. These are then divided into smaller lobes. Each of these lobes has specific responsibilities.

The frontal lobes are located at the front of the brain. The frontal lobes are important in personality, problem solving, reasoning, attention and focus.

- Broca's area is a small region in the frontal lobe, usually on the left side, that is important for language function.
- The motor strip is in the back part of the frontal lobes, and is important in controlling movement of the body. The brain controls the opposite side of the body. For example, the left motor strip controls the right side of the body, and vice versa.

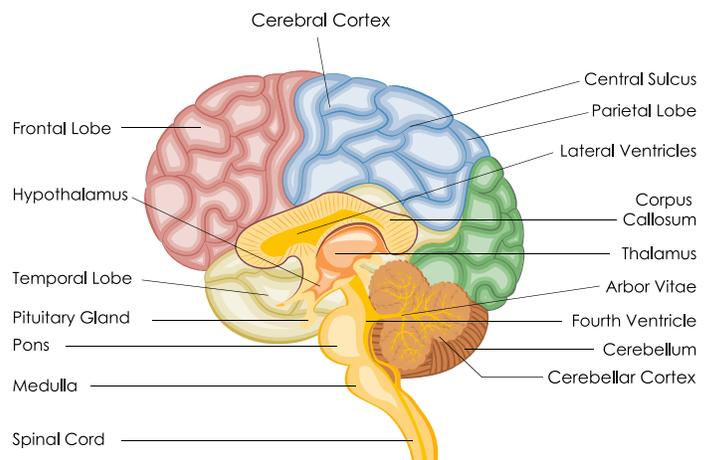
The parietal lobes are important in receiving and interpreting sensory information from the body, such as touch, temperature, pain and pressure. It also is important for reasoning and math skills.

The temporal lobes are important for the understanding of spoken language and sounds. It also plays a role in memory and emotion.

- Wernicke's area is a small area in the temporal lobe that is involved in understanding language.

The occipital lobes receive and interpret visual information.

There are some deep structures (called the diencephalon) that serve important functions. The **thalamus** acts as a "relay station" for information that passes through the brain. It sends incoming information to the brain for interpretation. The **hypothalamus** is important in controlling some of the automatic (or autonomic) functions of the brain. It controls hormone systems (via the pituitary gland), hunger and digestion, sleep and body temperature. The **pituitary gland** controls several hormone systems, including the thyroid hormone, growth hormone and sex hormone systems.



The **cerebellum** (Latin for "little brain") is located at the base of the brain in the back. It is in a region called the "posterior fossa." The cerebellum is important in control of balance, coordination and muscle tone.

The **brain stem** carries information back and forth between the brain and the rest of the body. It is made up of the midbrain, pons, and medulla.

- The **midbrain** carries out many different functions. It is involved in sleep and wake cycles, and also processed special sensory information like vision and hearing.
- The **pons** has direct connections to the cerebellum. It is important for coordination of movements of the eyes and face.
- The **medulla** controls heart rate, breathing and swallowing.

The outer surface of the brain is composed of gray matter (so named because of its gray appearance). The gray matter is made up of the cell bodies of the nerve cells and forms the cerebral cortex. This is clinically important because most seizures originate from the cortex. Beneath the gray matter is the white matter, which is made up of myelinated, or insulated fibers, which are lighter in color. White matter is clinically important because it is a frequent site for inflammation and autoimmune processes.

The brain receives its blood supply from the carotid arteries (the anterior circulation) and from the vertebral-basilar system (the posterior circulation.) In strokes, some autoimmune diseases and injuries, the blood vessels can be affected.

References

Brain Basics: Know Your Brain. NINDS. 2012. Web. 19 Mar 2013. <http://www.ninds.nih.gov/disorders/brain_basics/know_your_brain.htm#cortex>

