

Brain, Brain Information, Facts, News, Photos – National Geographic

Making sense of the brain's mind-boggling complexity isn't easy. What we do know is that it's the organ that makes us human, giving people the capacity for art, language, moral judgments, and rational thought. It's also responsible for each individual's personality, memories, movements, and how we sense the world.

All this comes from a jellylike mass of fat and protein weighing about 3 pounds (1.4 kilograms). It is, nevertheless, one of the body's biggest organs, consisting of some 100 billion nerve cells that not only put together thoughts and highly coordinated physical actions but regulate our unconscious body processes, such as digestion and breathing.

The brain's nerve cells are known as **neurons**, which make up the organ's so-called "gray matter." The neurons transmit and gather electrochemical signals that are communicated via a network of millions of nerve fibers called **dendrites** and **axons**. These are the brain's "white matter."

The **cerebrum** is the largest part of the brain, accounting for 85 percent of the organ's weight. The distinctive, deeply wrinkled outer surface is the **cerebral cortex**, which consists of gray matter. Beneath this lies the white matter. It's the cerebrum that makes the human brain—and therefore humans—so formidable. Whereas animals such as elephants, dolphins, and whales have larger brains, humans have the most developed cerebrum. It's packed to capacity inside our skulls, enveloping the rest of the brain, with the deep folds cleverly maximizing the cortex area.

The cerebrum has two halves, or **hemispheres**. It is further divided into four regions, or lobes, in each hemisphere. The **frontal lobes**, located behind the forehead, are involved with speech, thought, learning, emotion, and movement. Behind them are the **parietal lobes**, which process sensory information such as touch, temperature, and pain. At the rear of the brain are the **occipital lobes**, dealing with vision. Lastly, there are the **temporal lobes**, near the temples, which are involved with hearing and memory.

Movement and Balance

The second largest part of the brain is the **cerebellum**, which sits beneath the back of the cerebrum. It is responsible for coordinating muscle movement and controlling our balance. Consisting of both grey

and white matter, the cerebellum transmits information to the spinal cord and other parts of the brain.

The **diencephalon** is located in the core of the brain. A complex of structures roughly the size of an apricot, the two major sections are the **thalamus** and **hypothalamus**. The thalamus acts as a relay station for incoming nerve impulses from around the body that are then forwarded to the appropriate brain region for processing. The hypothalamus controls hormone secretions from the nearby **pituitary gland**. These hormones govern growth and instinctual behavior such as eating, drinking, sex, anger, and reproduction. The hypothalamus, for instance, controls when a new mother starts to lactate.

The **brain stem**, at the organ's base, controls reflexes and crucial, basic life functions such as heart rate, breathing, and blood pressure. It also regulates when you feel sleepy or awake.

The brain is extremely sensitive and delicate, and so requires maximum protection. This is provided by the surrounding skull and three tough membranes called meninges. The spaces between these membranes are filled with fluid that cushions the brain and keeps it from being damaged by contact with the inside of the skull.