

AP Psychology

The Brain

Unit 1: Biological Bases of Behavior

About the Brain

The brain contains about 86 billion neurons. Groups of neurons link together to form neural circuits, and these circuits are organized differently in discrete brain regions that carry out specific tasks.

Different regions of the brain interconnect to coordinate actions, like guiding motor skills using visual information.

Brainstem

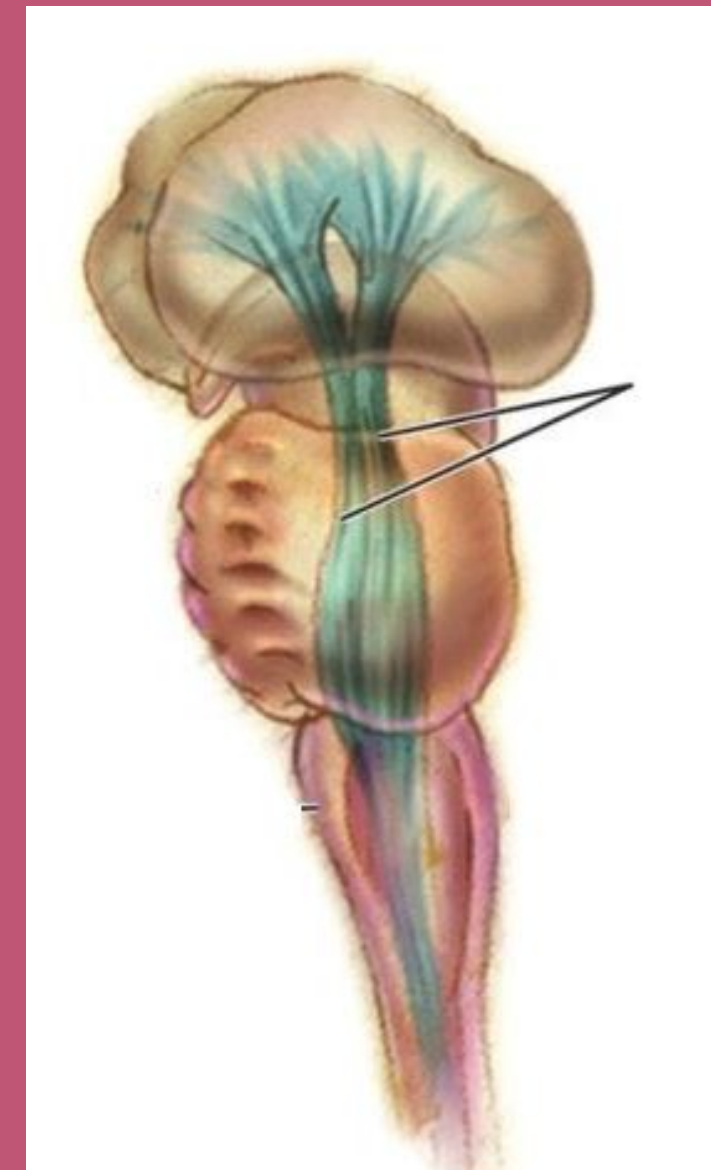
incl. Medulla

Located at the base of the brain, the brainstem includes the medulla and generally controls basic functioning such as breathing and heart rate. Damage to this area of the brain would pose the biggest threat to your life.



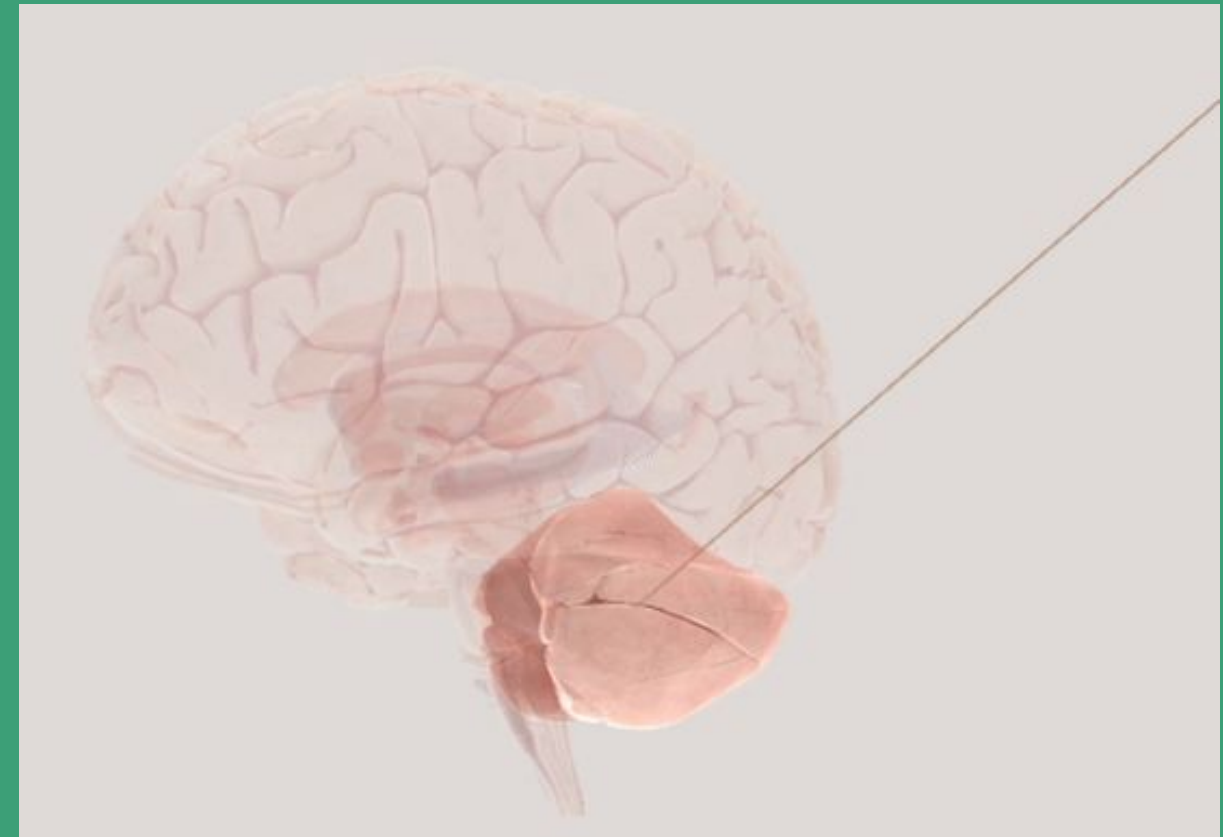
Reticular Activating System and the brain's reward center

Located inside of the brainstem, the reticular activating system and the brain's [reward center](#) generally control some voluntary movement, eye movement, and some types of learning, cognition, and emotion.



Cerebellum

Located at the back and base of the brain, the cerebellum generally controls coordination of muscle movement, balance, and some forms of procedural learning.



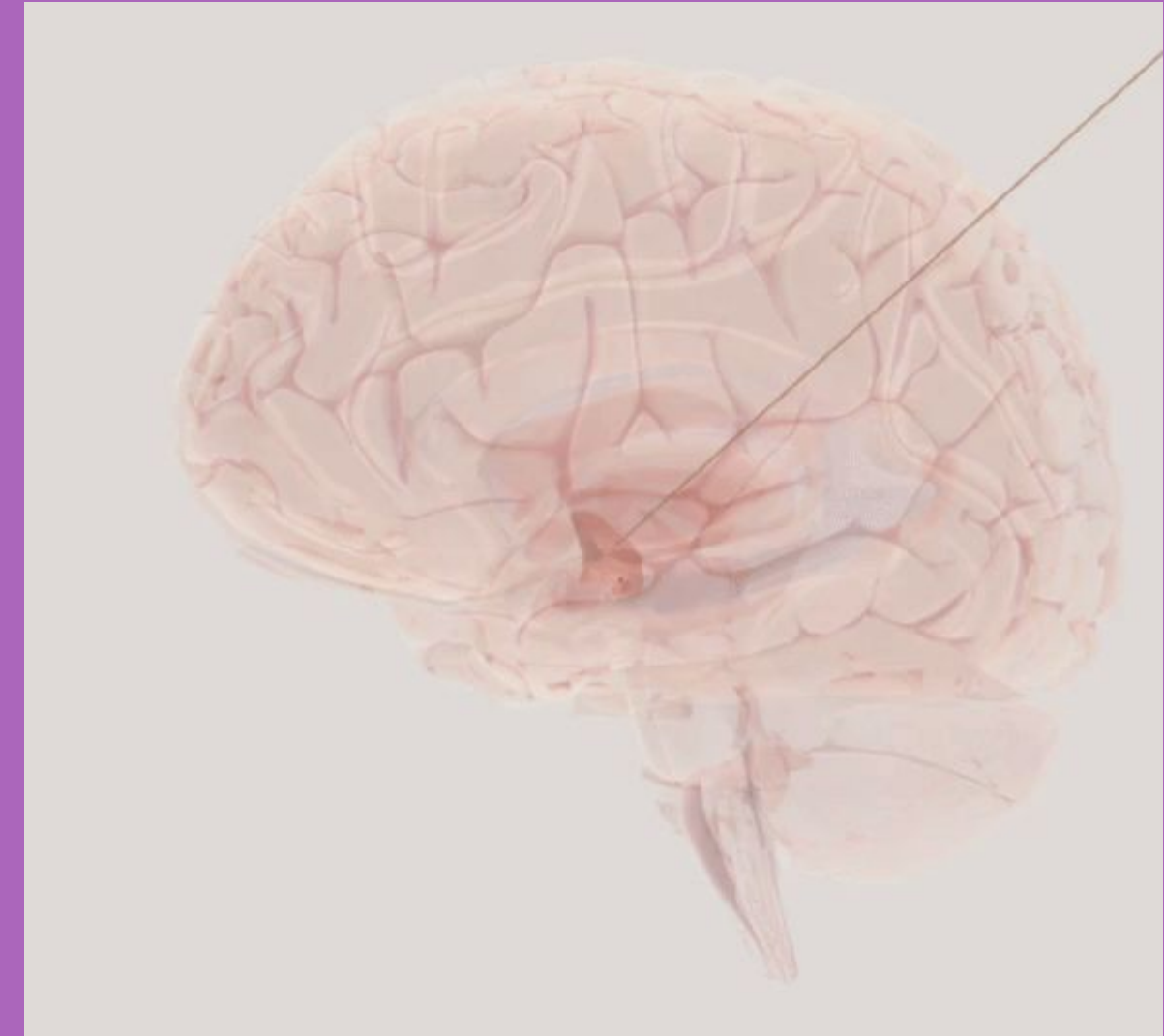
The Cerebral Cortex

The cerebral cortex is divided into two hemispheres and includes the limbic system (thalamus, hypothalamus, pituitary gland, hippocampus, amygdala), corpus callosum, and the lobes of the cortex.

The Limbic System

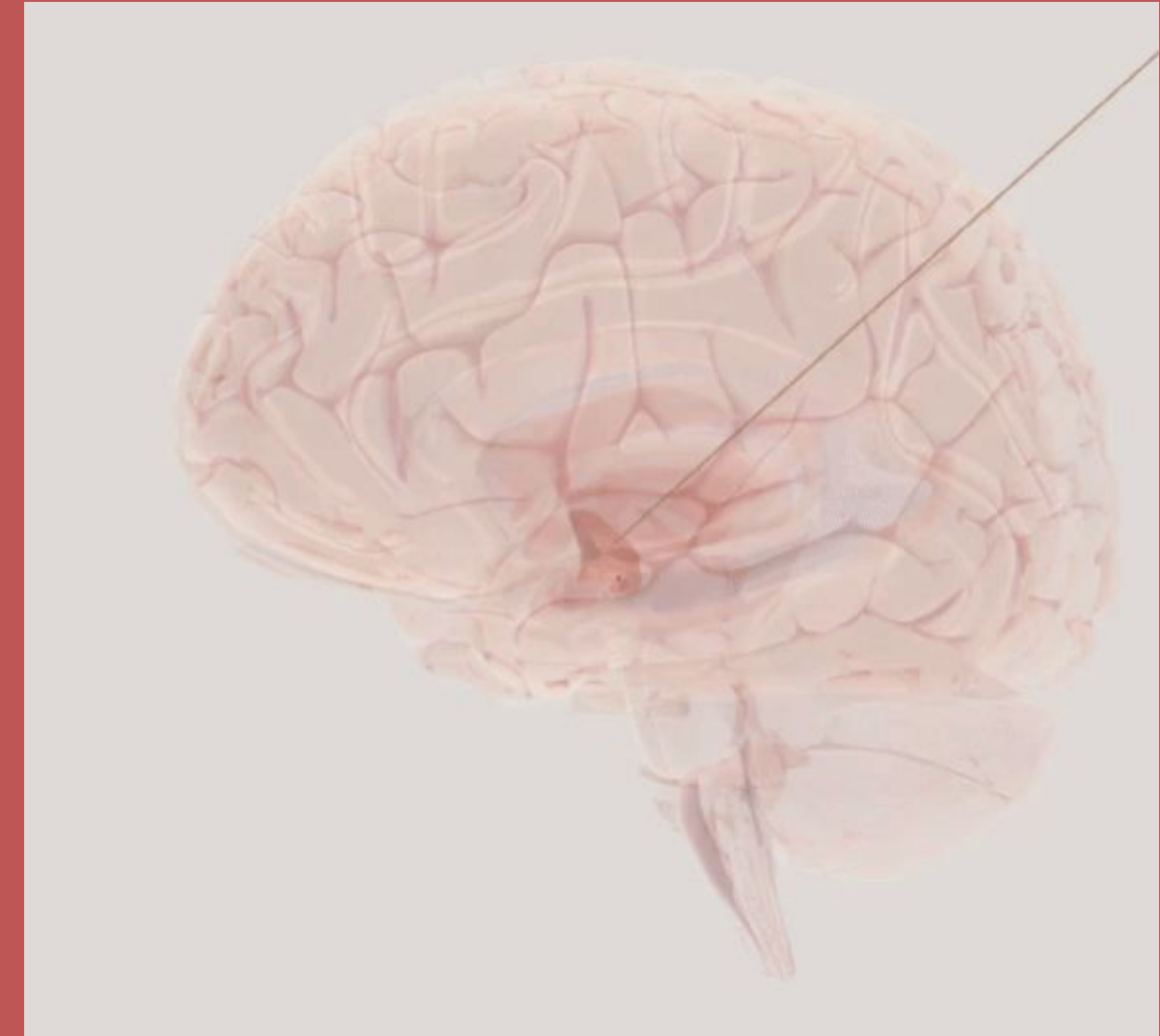
Thalamus

Think of the thalamus as you would air traffic control or a receptionist. Within those roles, information is received and then directed where it needs to go. The thalamus does the same with all sensory information (except sense of smell), taking in this information before directing it to the appropriate area of the cerebral cortex.



Hypothalamus

The bridge between the nervous and endocrine systems, the hypothalamus' main role is to keep the body regulated. It enables us to experience fight or flight as well as let the parasympathetic nervous system return us to homeostasis. It is responsible for our experience of hunger and thirst as well as the satiety of those drives. It helps us keep an appropriate body temperature and encourages the sexual response cycle.



The 5 Fs: Fight Flight Feeding Fahrenheit Fornication

Pituitary Gland

Controlled by the hypothalamus, the pituitary gland is often referred to as the "master gland" of the body because it is responsible for the release of hormones that regulate the activity of other endocrine glands and bodily systems; in this way it affects physiological processes throughout the body. In addition to a major role in our growth and development, the pituitary gland works alongside the hypothalamus to release hormones related to hunger.



Hippocampus

The hippocampus, located in the inner region of the brain, is crucial for learning, memory, and converting short-term to long-term memories. Memories aren't stored in the hippocampus, but must be routed through here to be directed to the appropriate areas for storage.



[Clive Wearing: The man with no short-term memory](#)

Amygdala

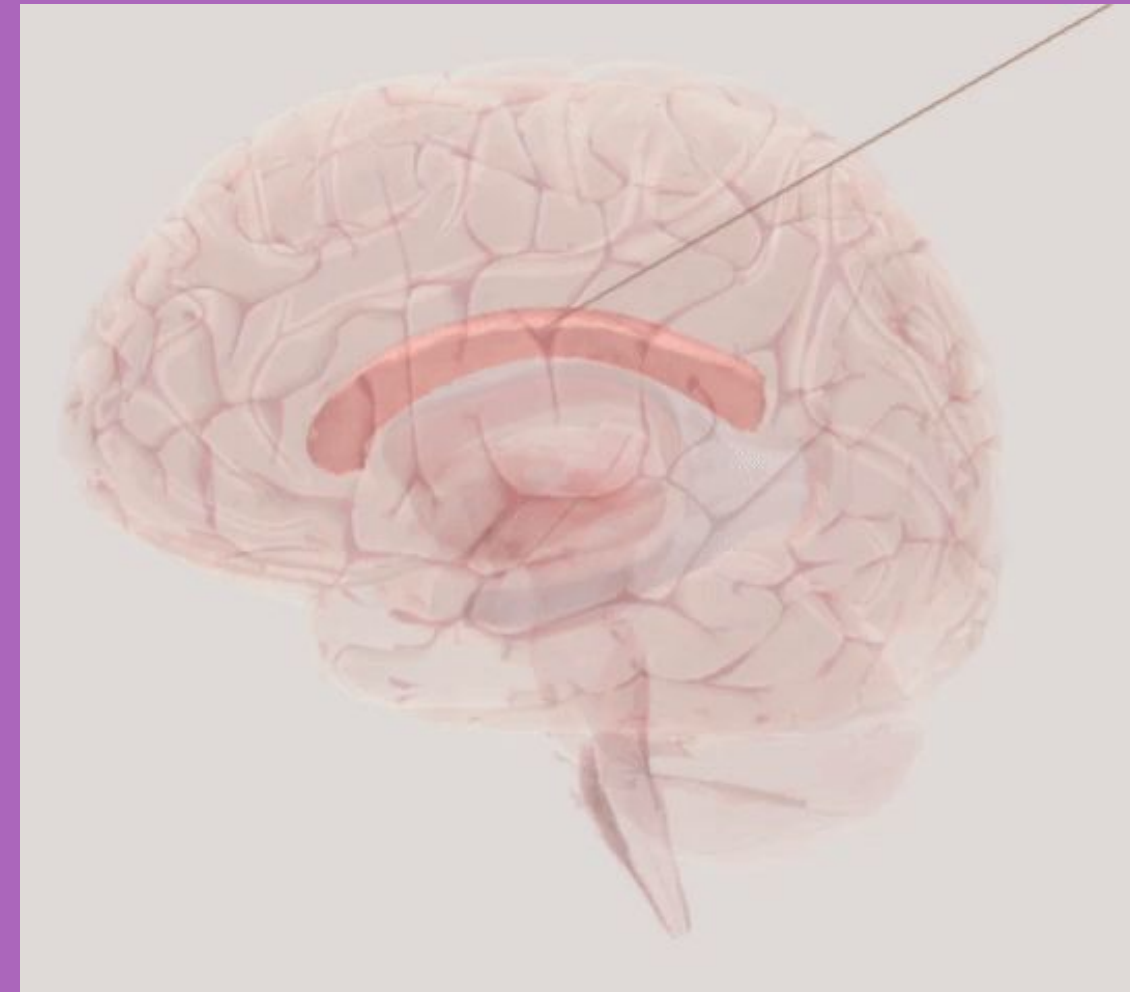
The amygdala is responsible for our experience of fear and aggression. When we are exposed to a threat, information about that stimulus is immediately sent to the amygdala, which can then send signals to areas of the brain like the hypothalamus to trigger a "fight-or-flight" response.



Corpus Callosum

Corpus Callosum

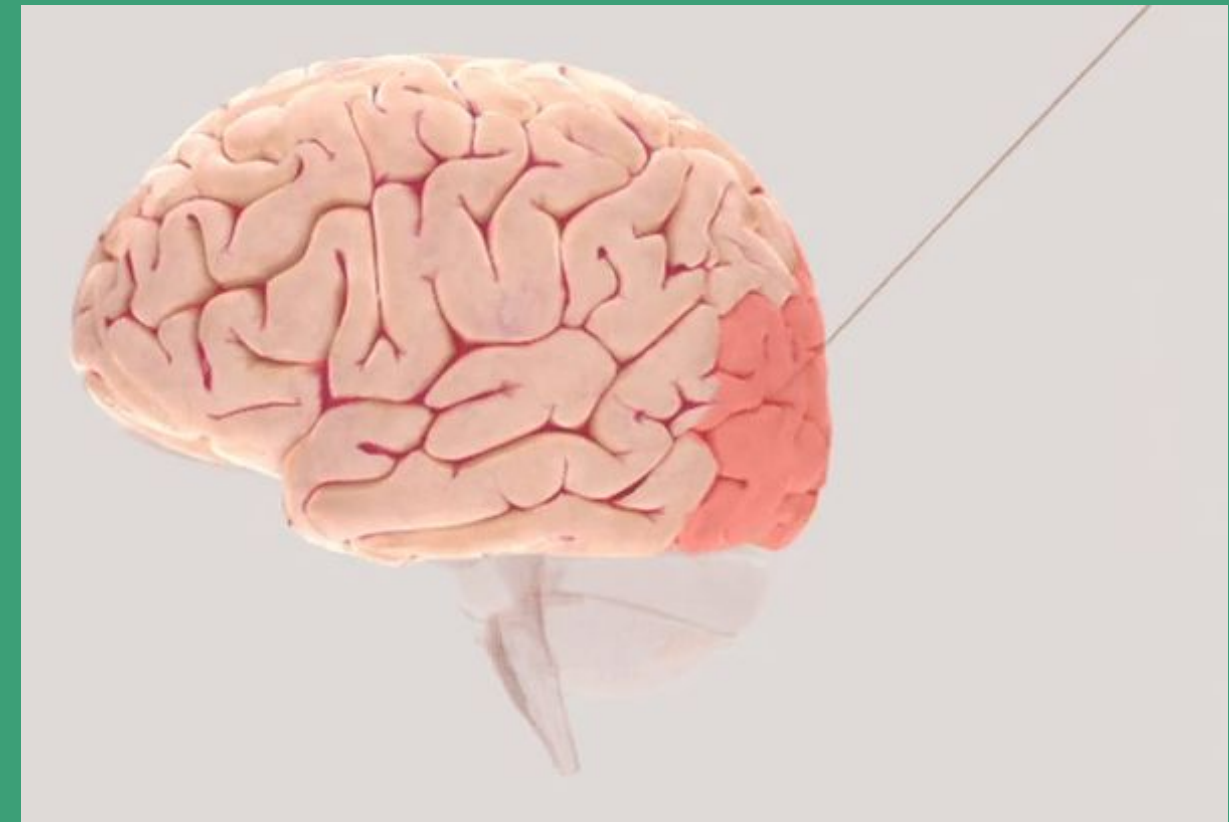
The corpus callosum is a band of neural fibers that connects the two hemispheres of the brain. This enables communication to go from one to the other, allowing the hemispheres to work together.



The Lobes

Occipital Lobes

The occipital lobes generally control visual information processing and are located in the rear of the brain.



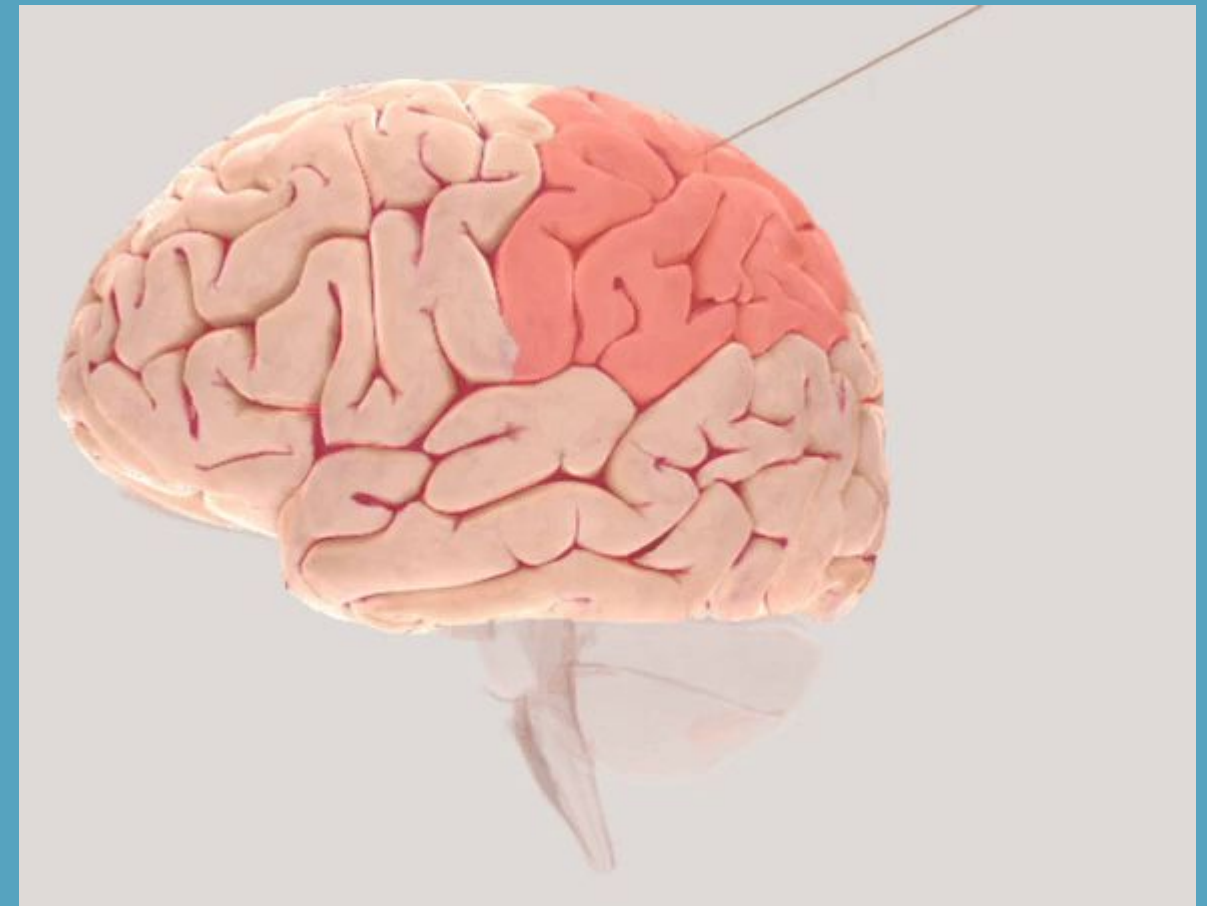
Temporal Lobes

The temporal lobes generally control auditory and linguistic processing and are located on the sides of the brain. While it might make more sense for the occipital lobe, the right temporal lobe contains an association area which enables us to recognize faces.



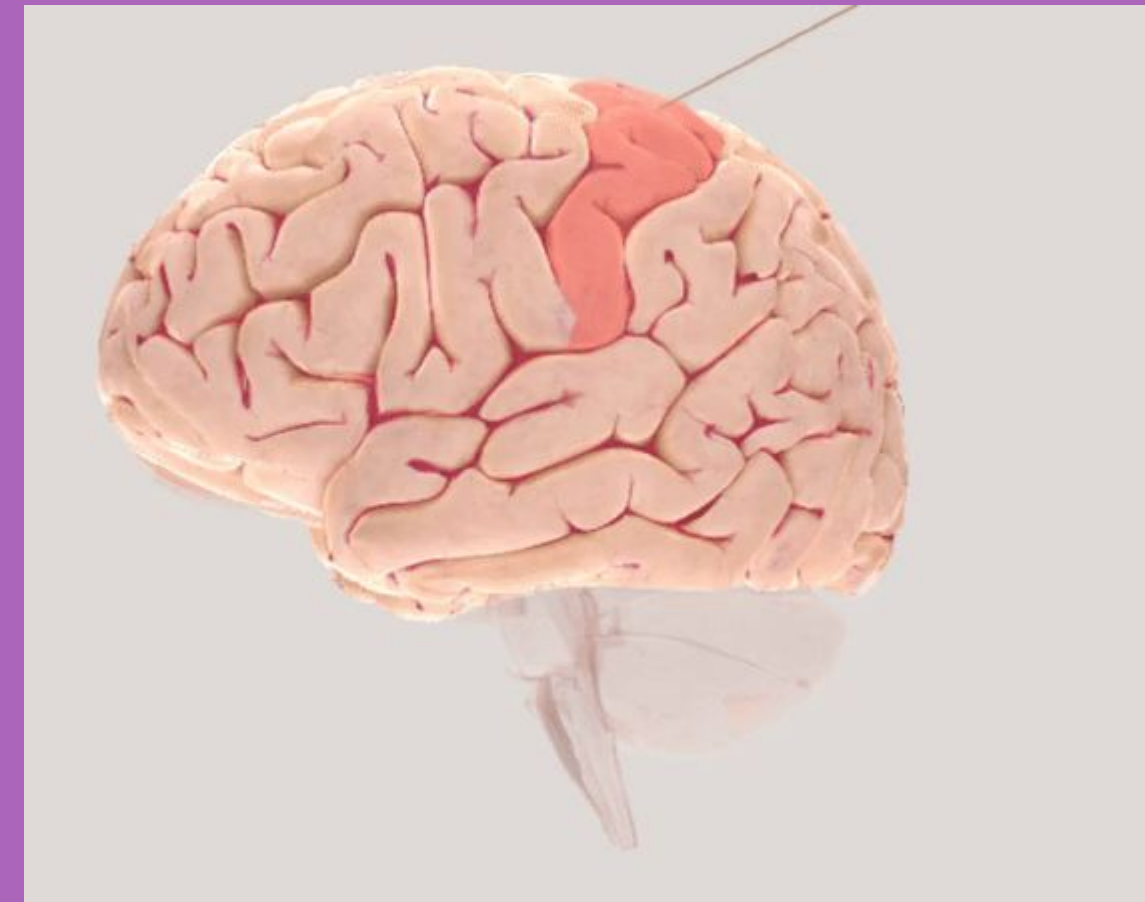
Parietal Lobes

The parietal lobes generally control association areas, which process and organize information, and the somatosensory cortex, which processes touch sensitivity. These lobes are located near the back crown of the brain.



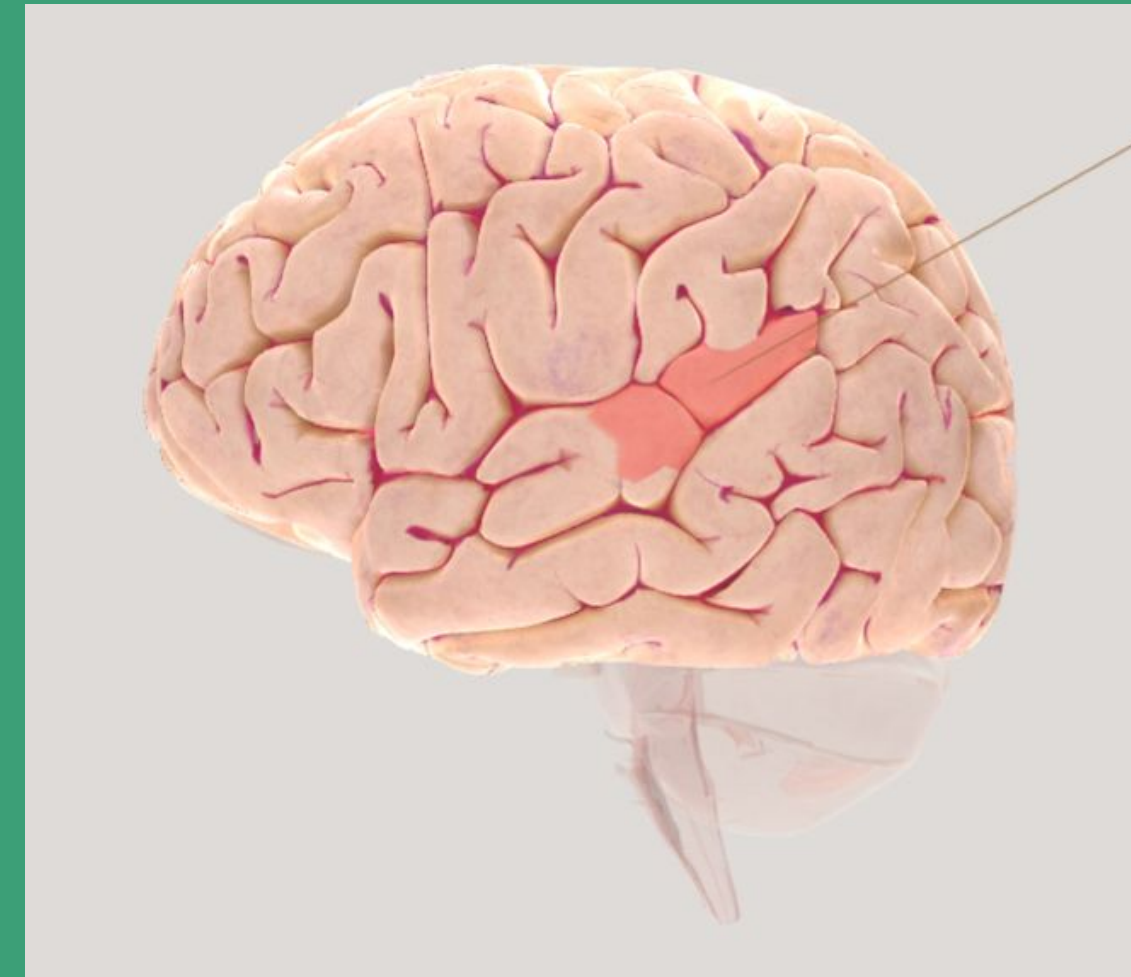
Somatosensory Cortex

Located at the front of the parietal lobe, the somatosensory cortex processes touch sensitivity. The more sensitive an area of the body is (for example, your fingertips versus the small of your back), the more area is dedicated to it on the somatosensory cortex.



Wernicke's Area

Located ONLY on left hemisphere, Wernicke's area is responsible for speech comprehension. Damage to this part of the brain can lead to [Wernicke's aphasia](#) in which an individual would have difficulties with spoken language whether from others or themselves. They would be able to speak clearly, but would not recognize that what they say does not make sense.



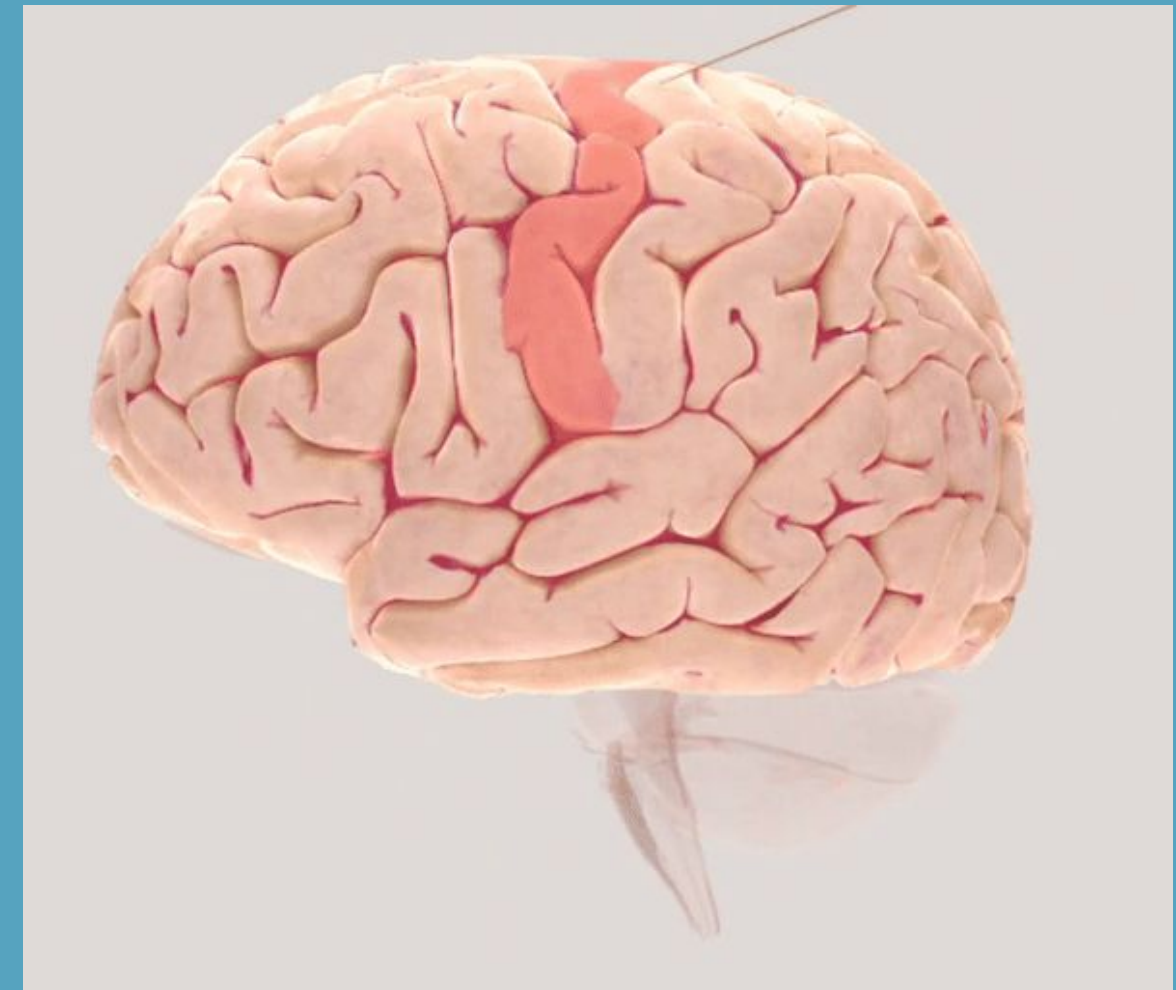
Frontal Lobes and Prefrontal Cortex

The frontal lobes, located just behind the forehead, generally control linguistic processing, higher-order thinking, and [executive functioning](#), especially in the prefrontal cortex.



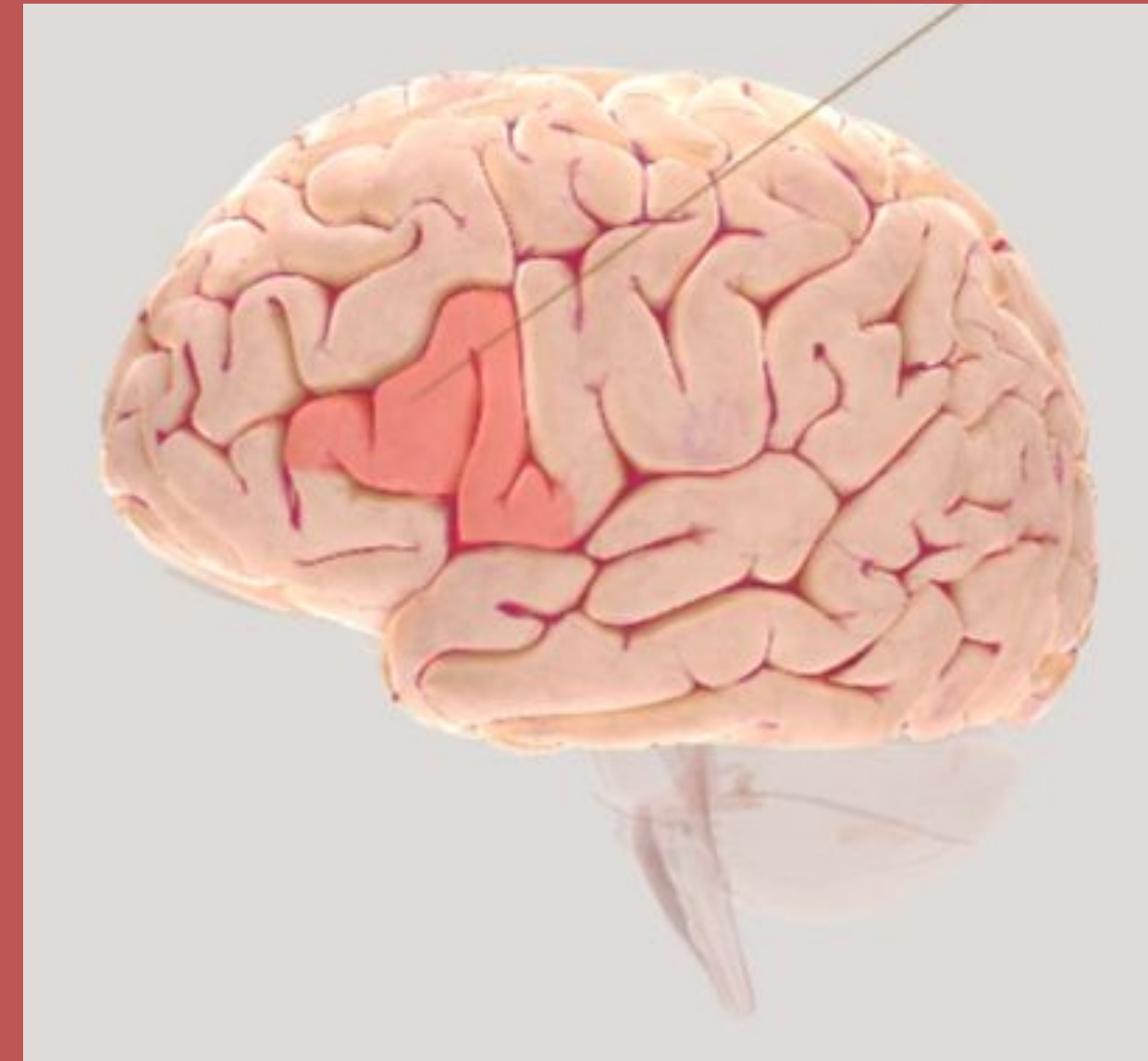
Motor Cortex

The motor cortex is located at the rear of the frontal lobes and controls most types of skeletal movement. Your purposeful and voluntary movements are courtesy of this part of the brain. The more a part of the body is used in purposeful movement, the more space is dedicated to it on the motor cortex, similar to the somatosensory cortex and sensitivity.



Broca's Area

Located within the frontal lobe and ONLY on left hemisphere, Broca's area is responsible for speech production. Damage to this part of the brain can lead to Broca's aphasia.



[Yearly updates of woman with Broca's aphasia \(watch the first 30-60 seconds of each.](#)