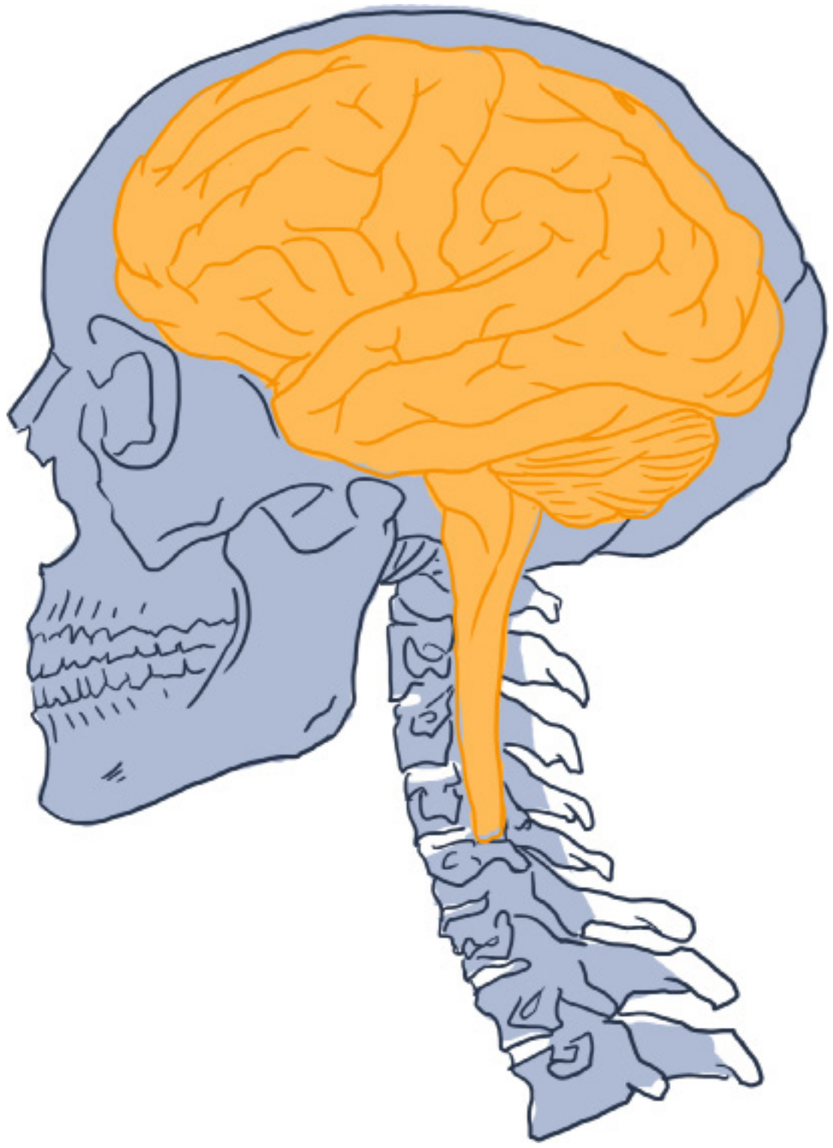
The Central Nervous System



steven j. barnes

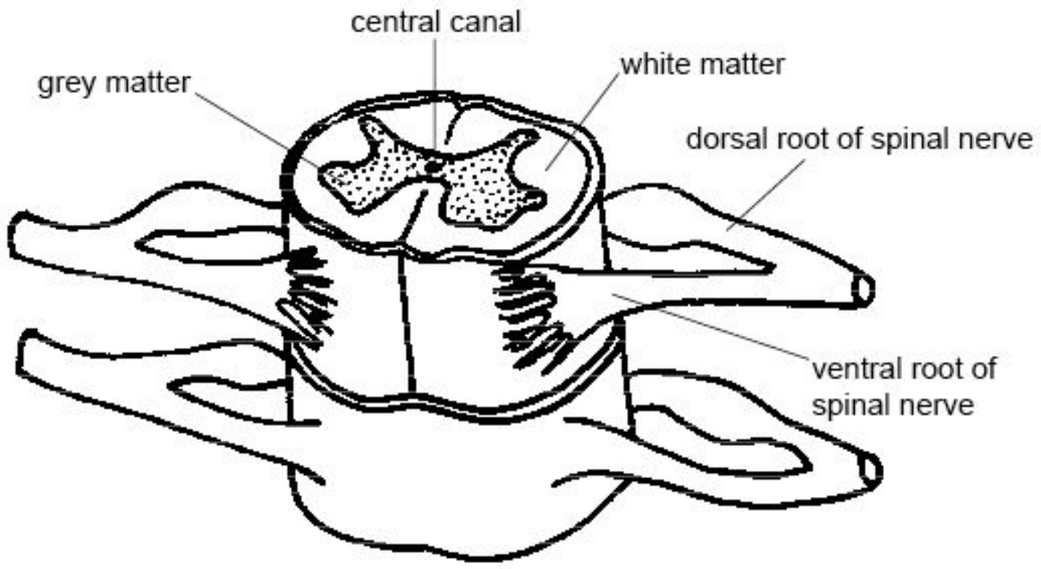
1. The Spinal Cord
2. Five Major Divisions of the Brain
3. Major Structures of the Brain
4. Lobes
5. The Limbic System

Topics

- Know the structure of the spinal cord.
- List and discuss the 5 divisions of the human brain.
- Know all the brain structures within each of the 5 divisions of the brain.
- Describe the location and function of the corpus callosum.
- Know the major fissures.
- Know the lobes of the cerebral cortex.
- Know the major components of the limbic system.

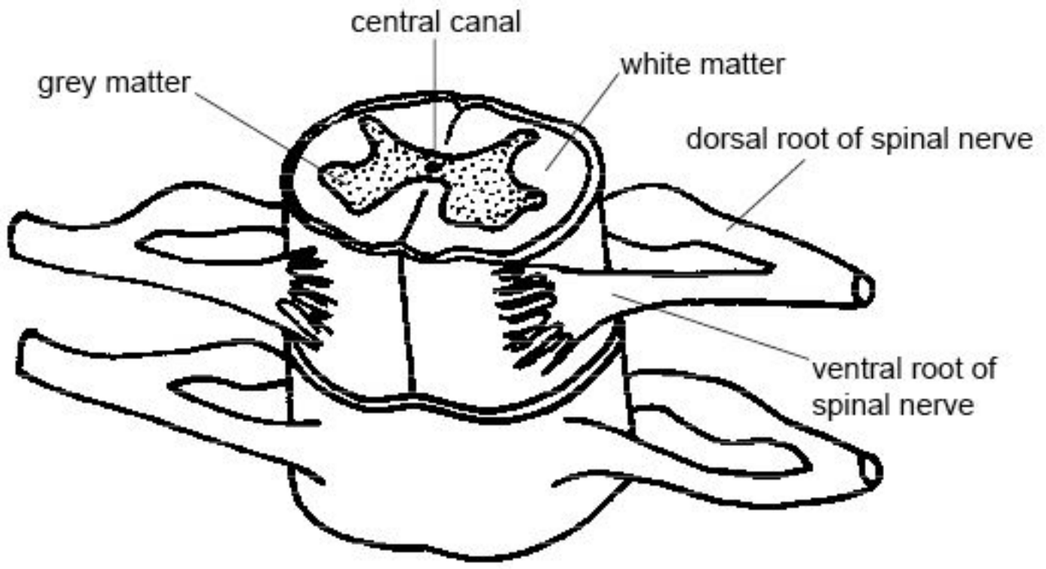
Lecture Learning Objectives

The spinal cord comprises two different areas: an inner H-shaped core of gray matter and a surrounding area of white matter.



Spinal Cord

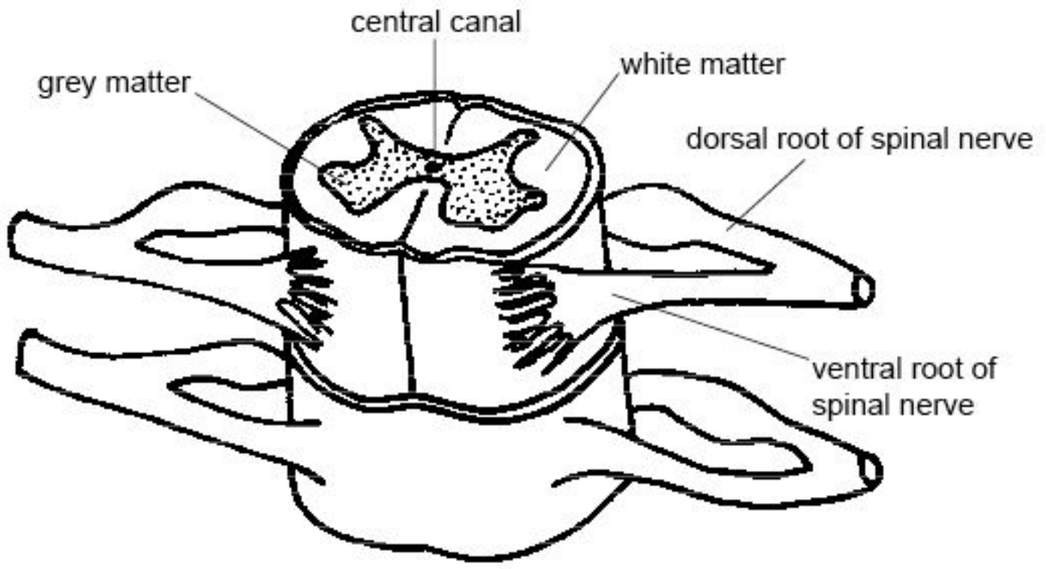
The spinal cord comprises two different areas: an inner H-shaped core of gray matter and a surrounding area of white matter.



The gray matter is composed largely of cell bodies and unmyelinated axons.

Spinal Cord

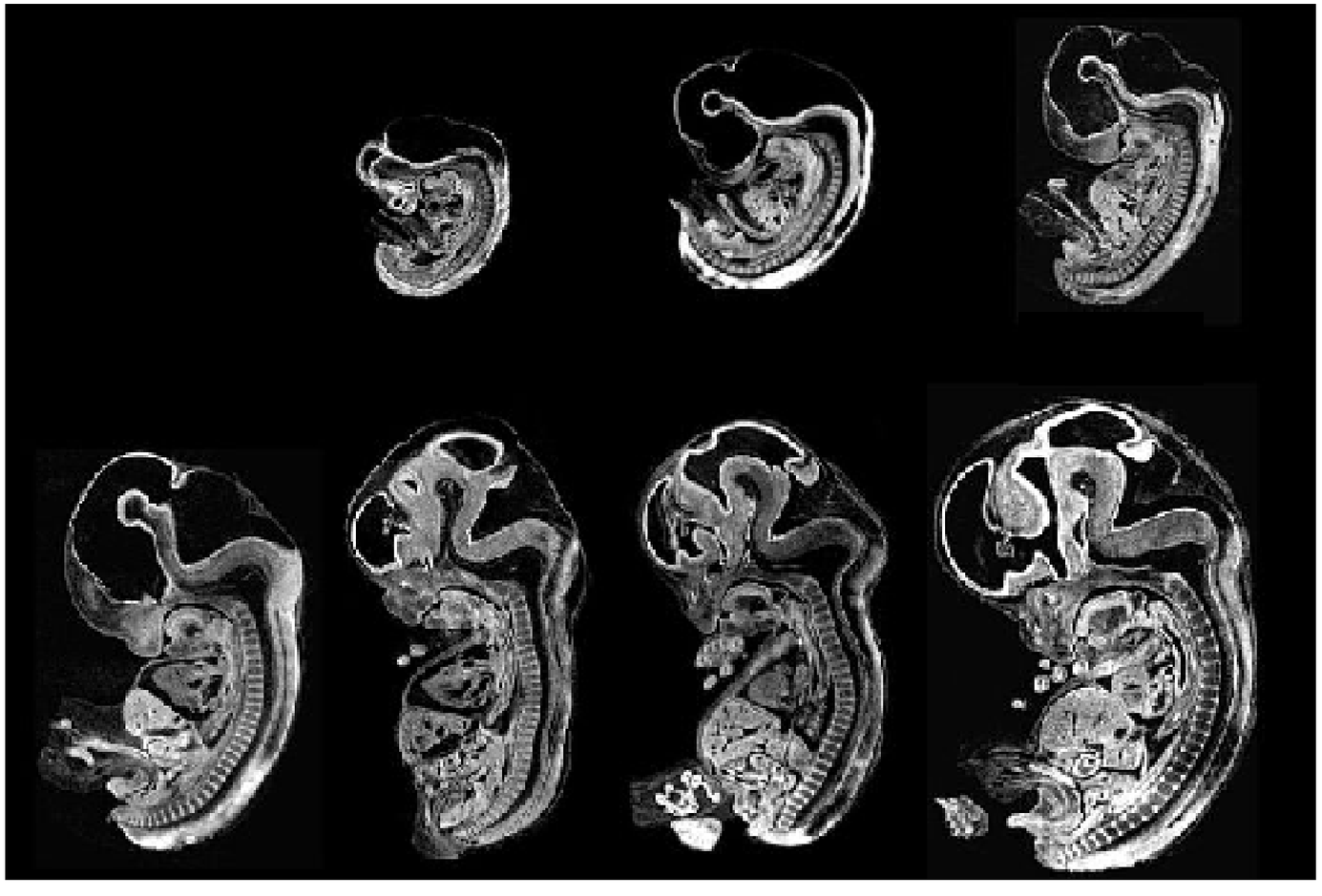
The spinal cord comprises two different areas: an inner H-shaped core of gray matter and a surrounding area of white matter.



The white matter is composed of myelinated axons.

Spinal Cord

Very early in development, 3 swellings appear; these are termed the forebrain, midbrain, and hindbrain.



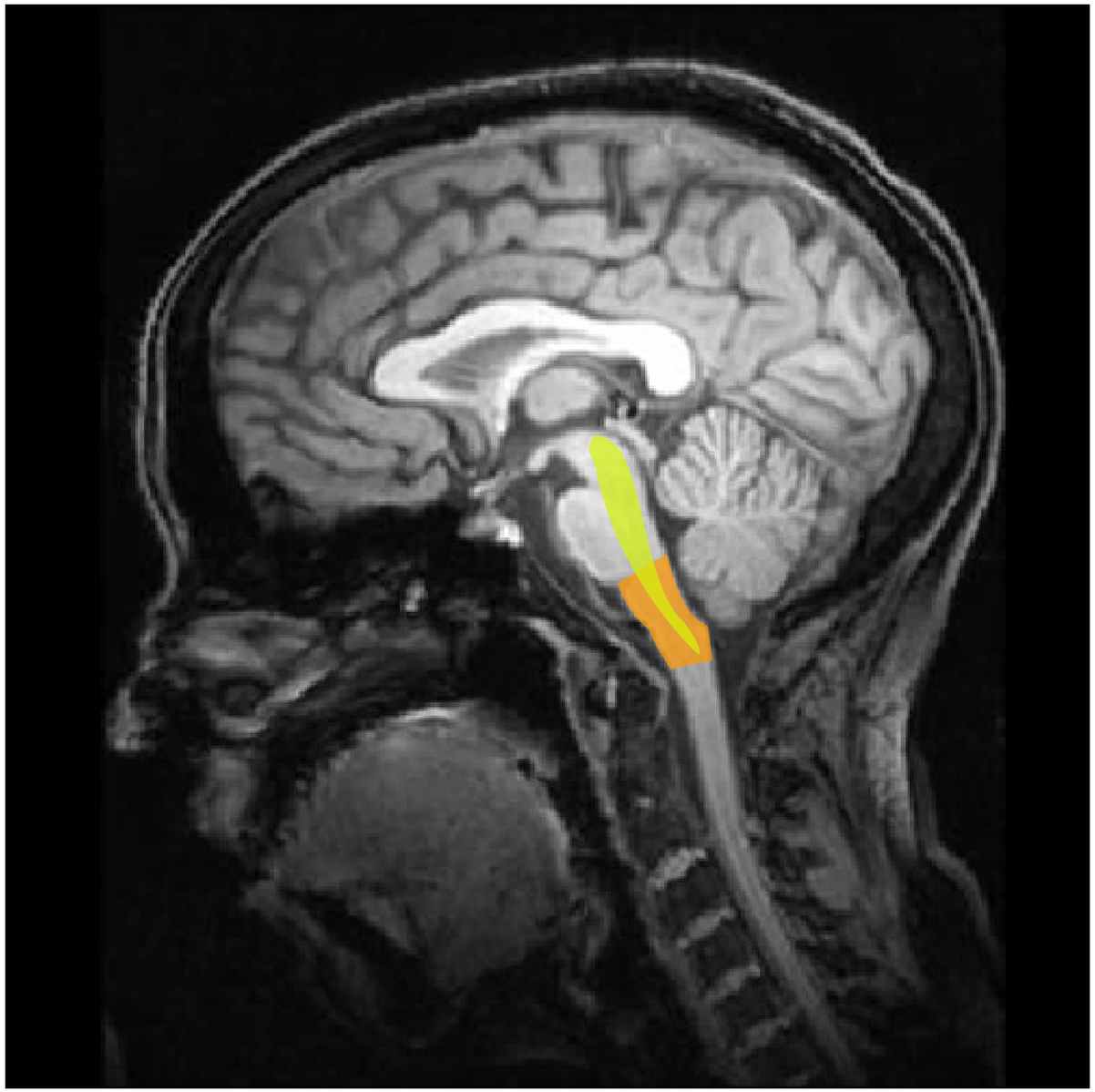
Major Divisions of the Brain

Myelencephalon (aka: Medulla)

Composed largely of tracts carrying signals between the rest of the brain and the body.

Major Divisions of the Brain

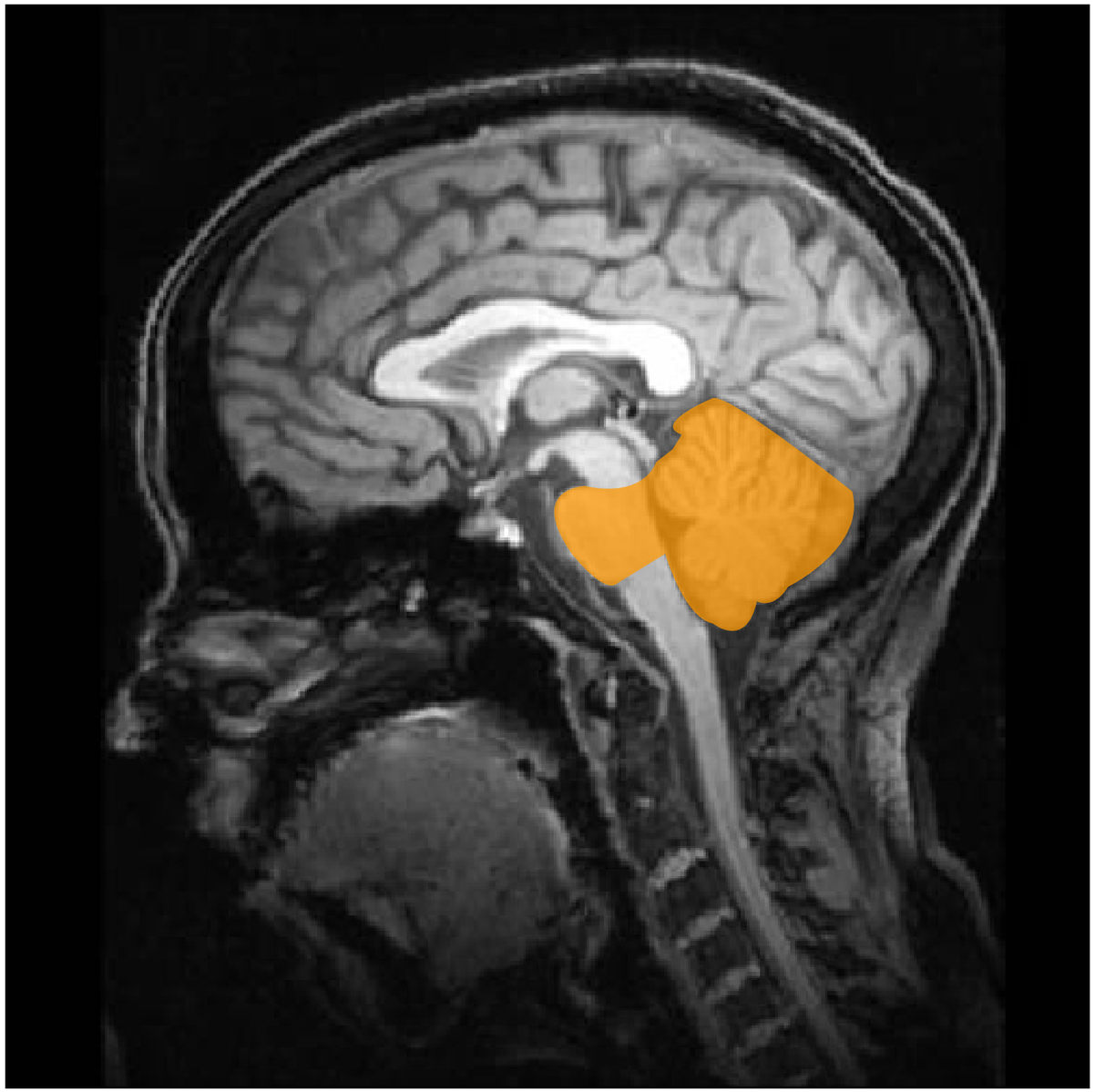
Myelencephalon (aka: Medulla)



Reticular formation: ~100 nuclei involved in myriad functions.

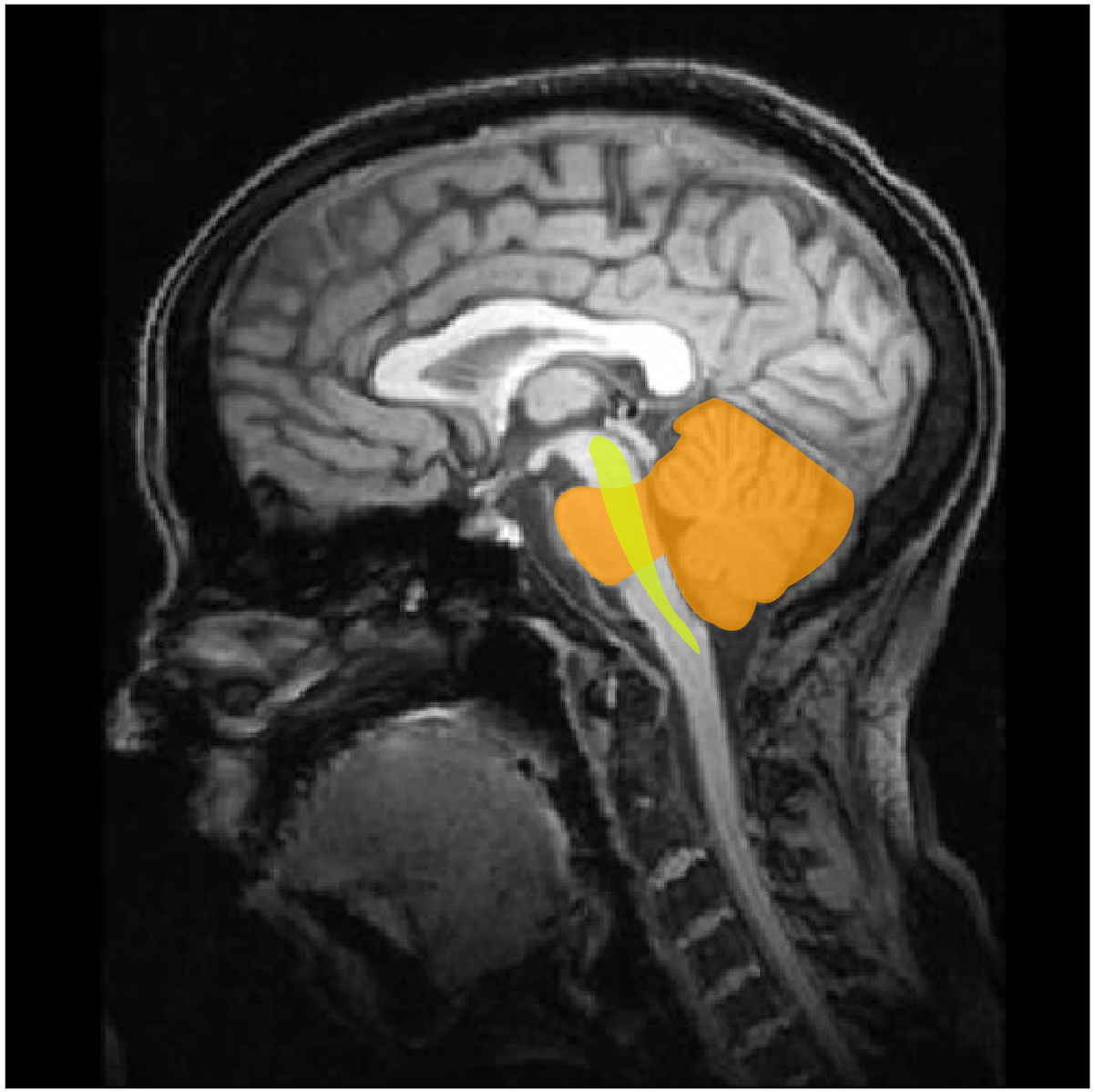
Major Divisions of the Brain

Metencephalon



Like the myelencephalon, houses many fiber tracts.

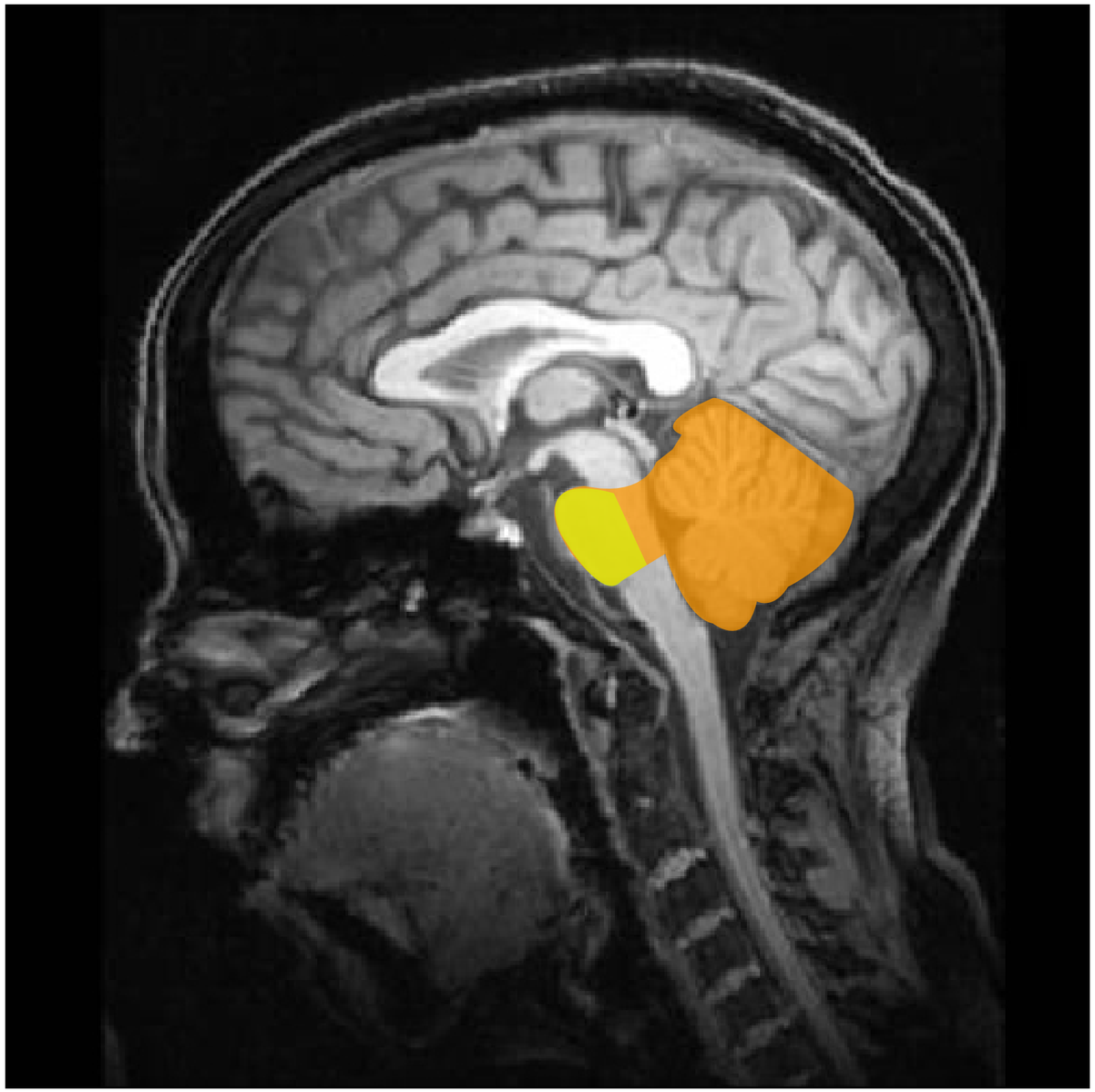
Metencephalon



Also houses the reticular formation.

Major Divisions of the Brain

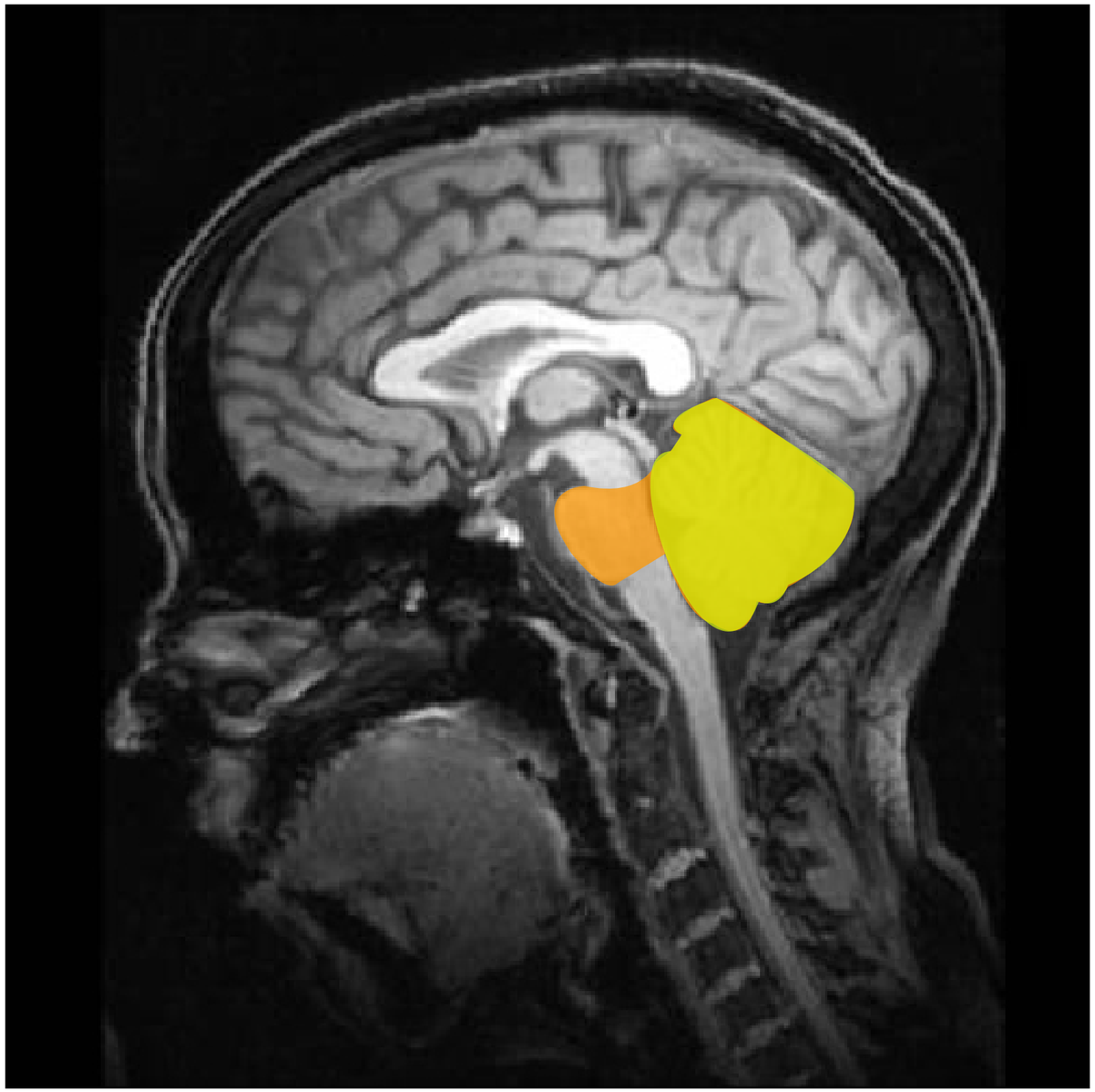
Metencephalon



All those fibers, and the pontine nuclei, create a large bulge--called the pons.

Major Divisions of the Brain

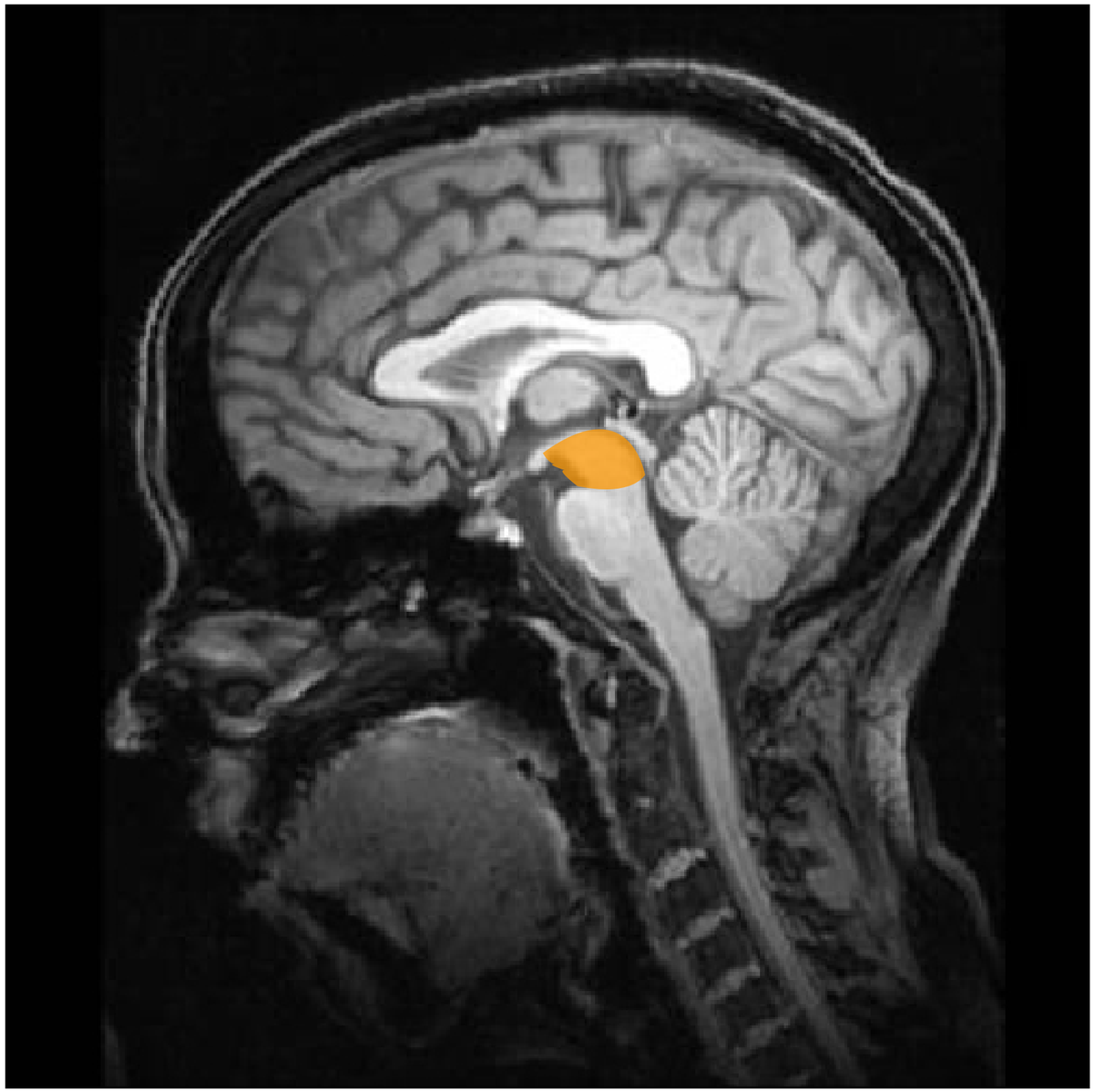
Metencephalon



Despite taking up only 10% of the brain's volume, the cerebellum contains ~50% of all of its neurons.

Major Divisions of the Brain

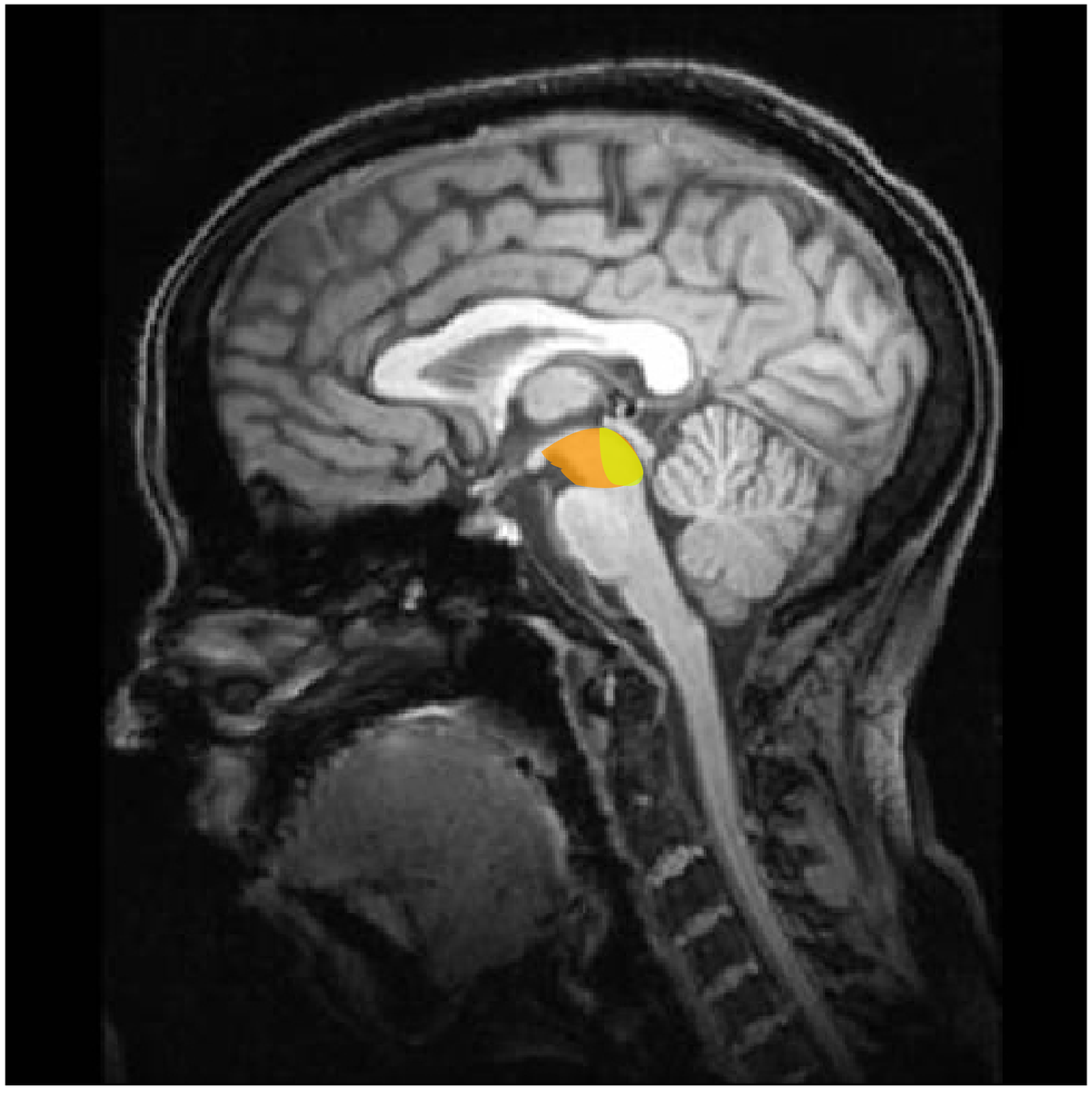
Mesencephalon



Composed of the tectum and the tegmentum.

Major Divisions of the Brain

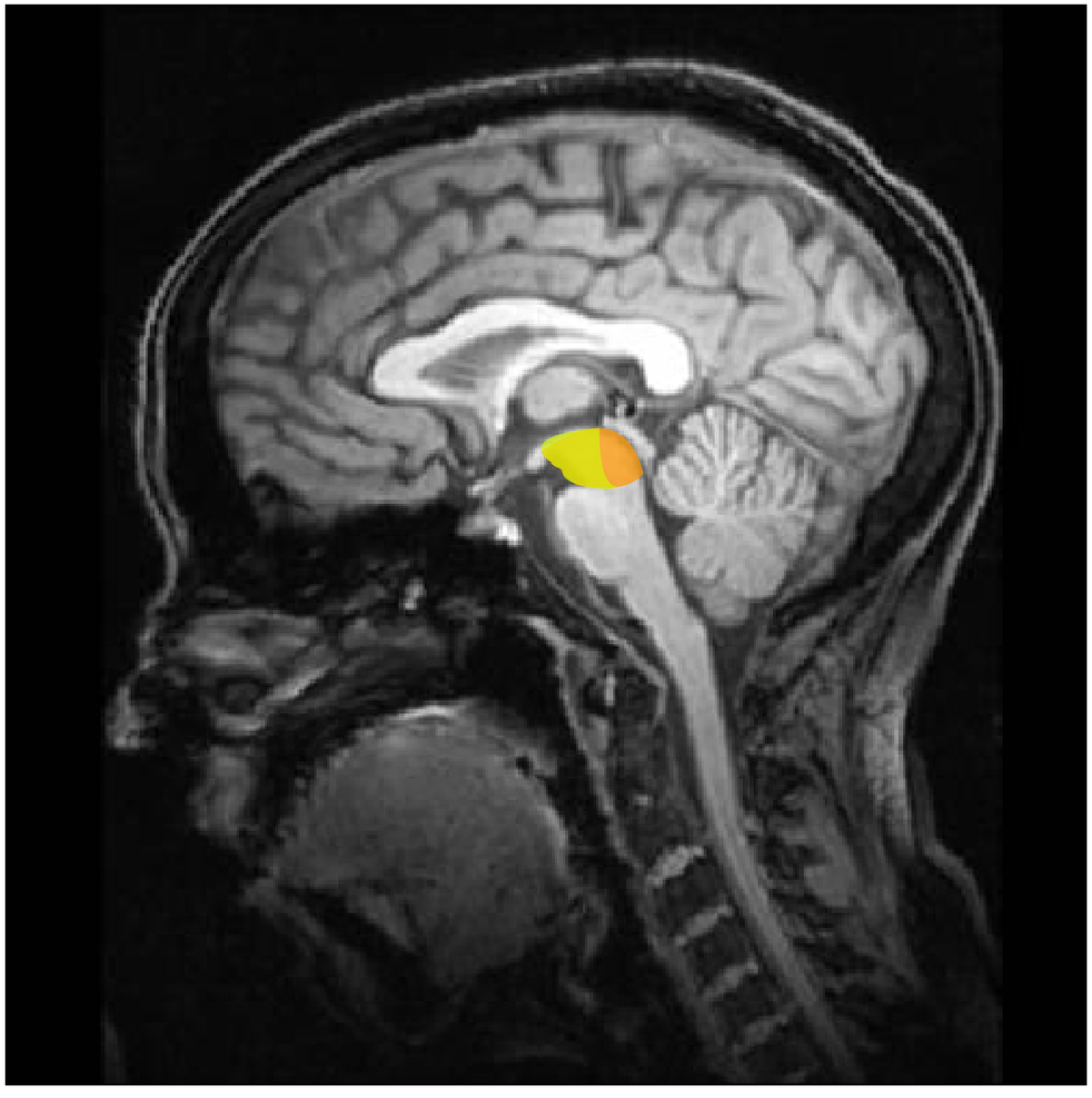
Mesencephalon



Tectum: In mammals, is composed of two pairs of bumps: The inferior colliculi and the superior colliculi.

Major Divisions of the Brain

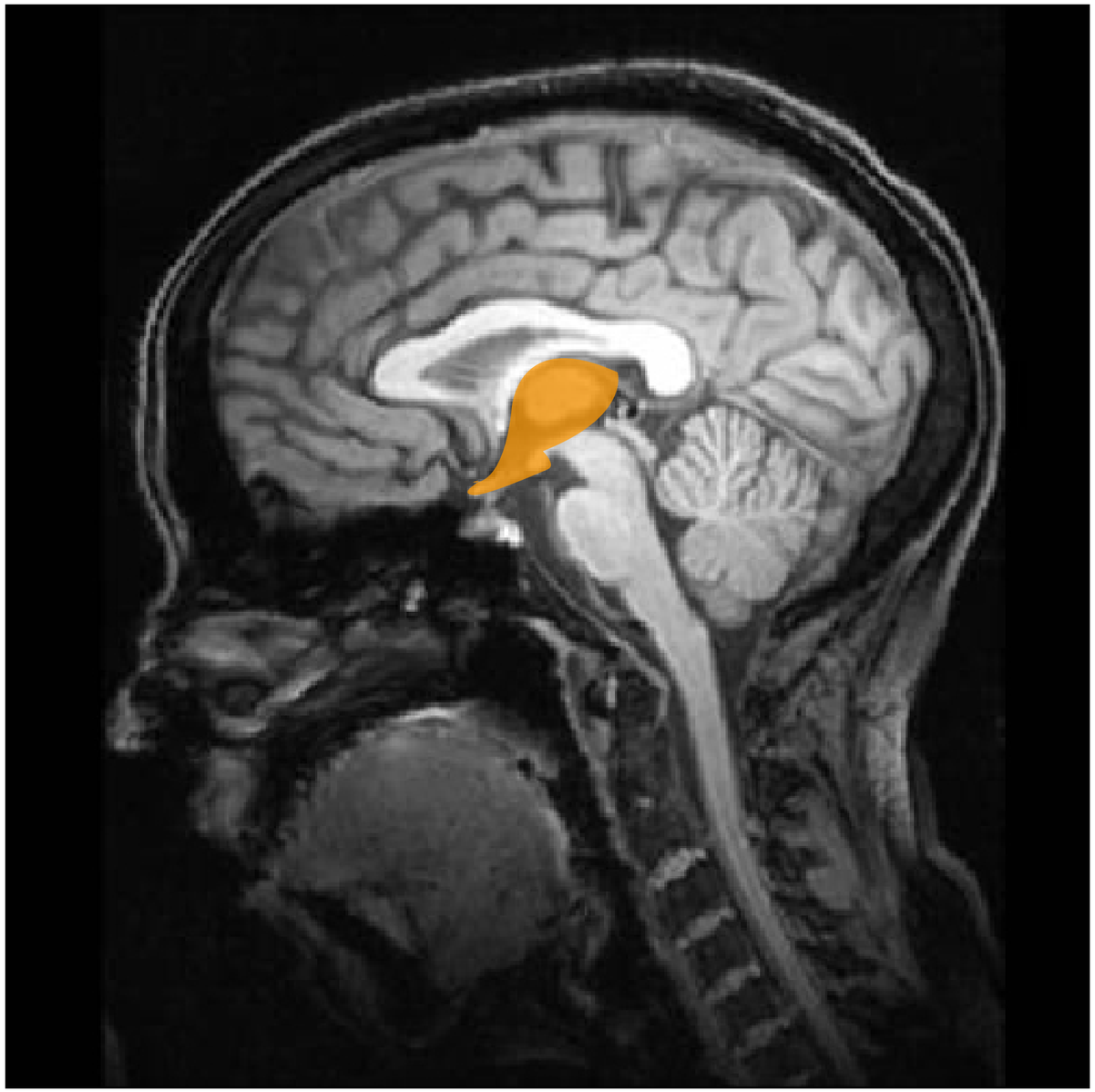
Mesencephalon



Tegmentum: Contains the top of the reticular formation, fibers of passage, the periaqueductal grey, the substantia nigra, and the red nucleus.

Major Divisions of the Brain

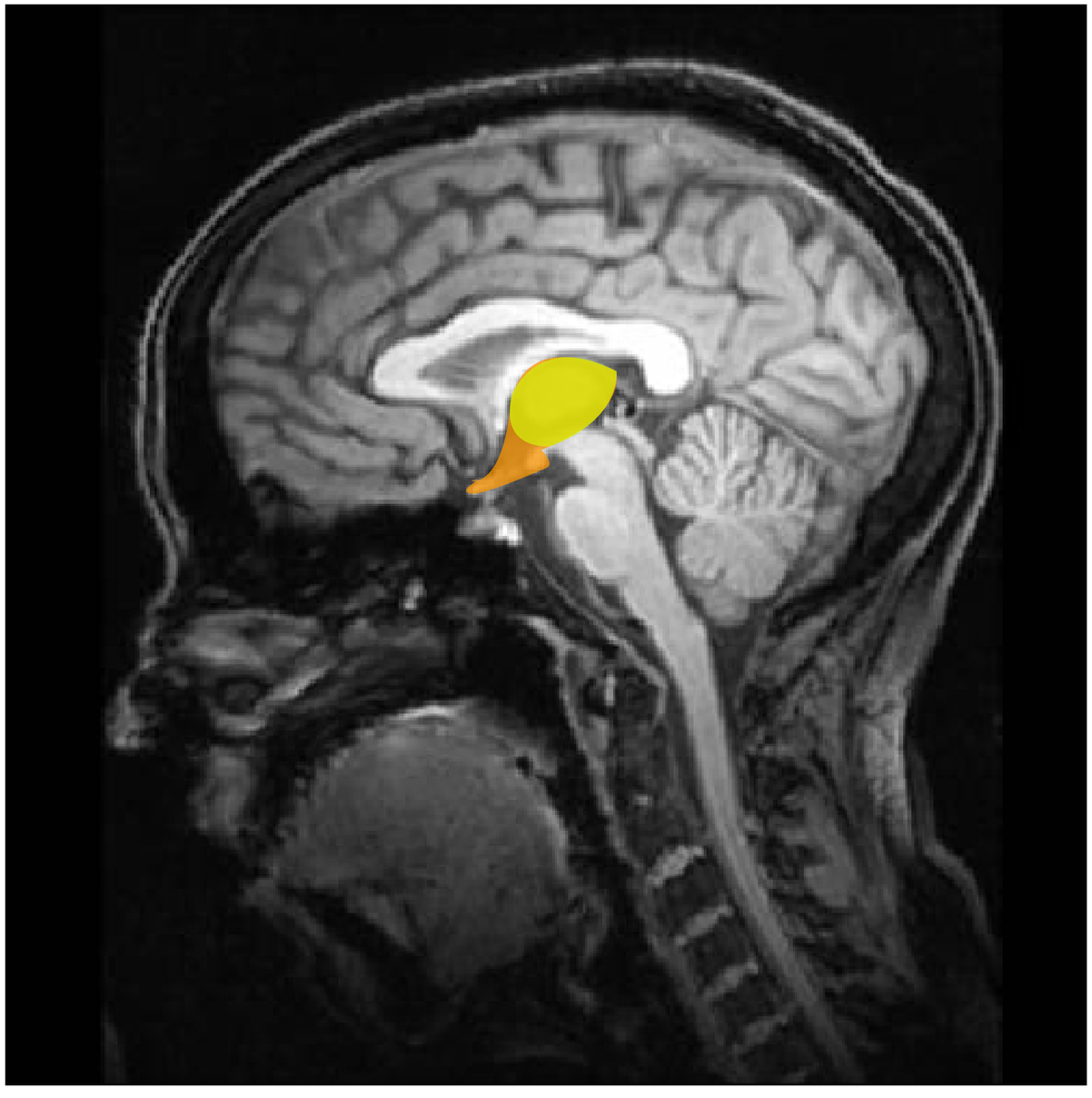
Diencephalon



Composed of two structures:
Thalamus and Hypothalamus.

Major Divisions of the Brain

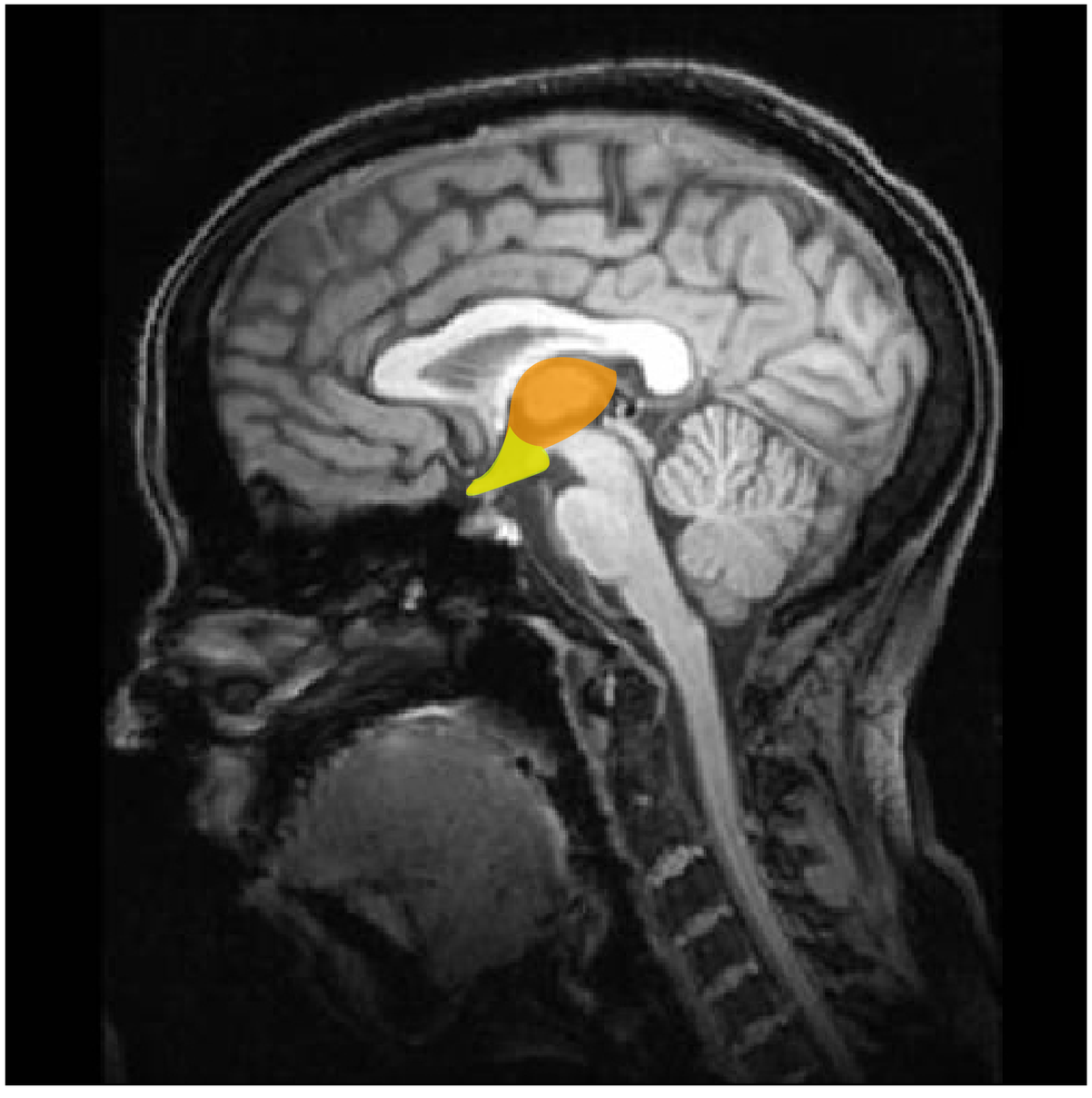
Diencephalon



Thalamus: Comprises many different types of nuclei--some are sensory relay nuclei.

Major Divisions of the Brain

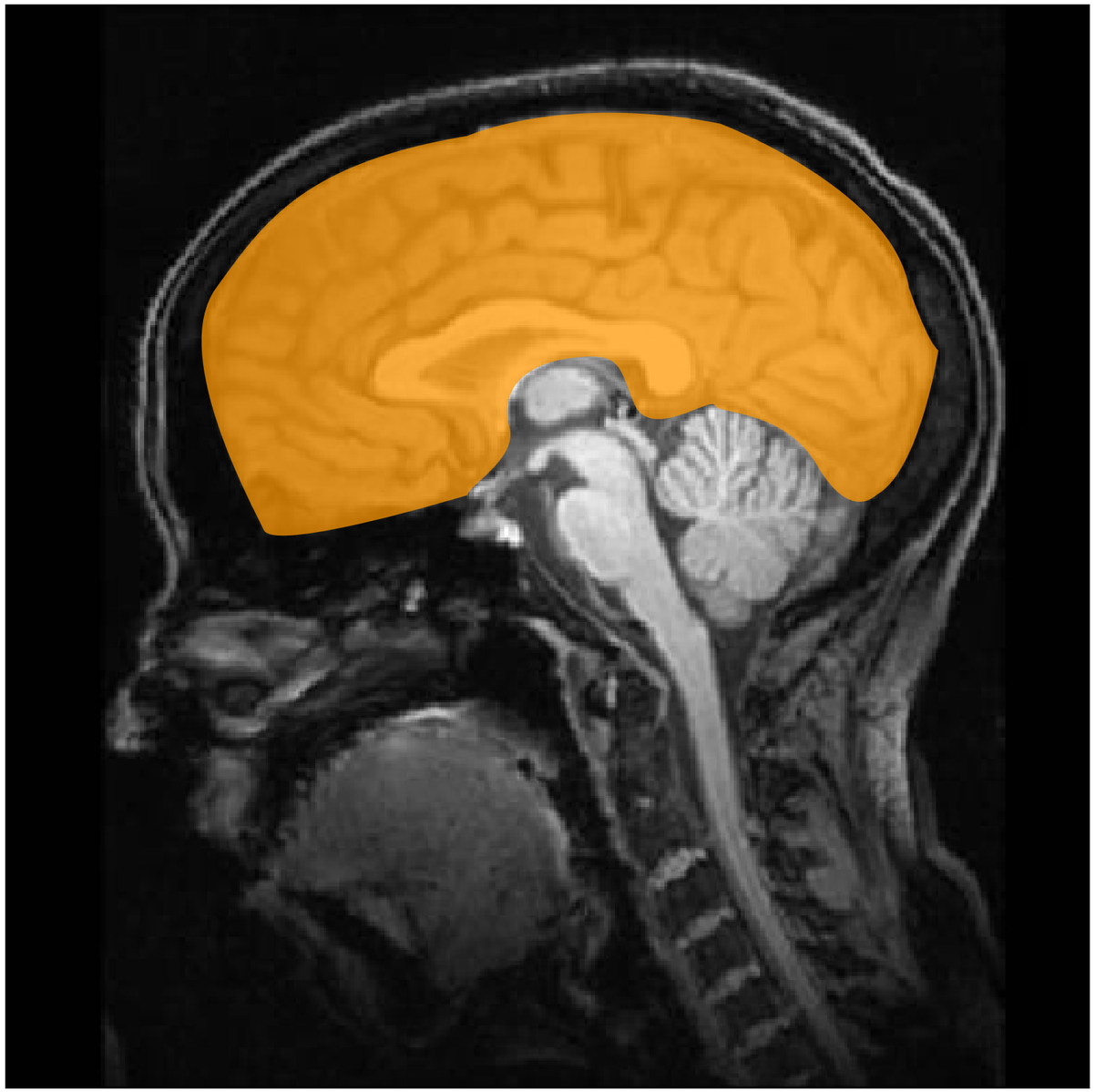
Diencephalon



Hypothalamus: Plays an important role in several behaviors. In part, via its effects on the pituitary gland.

Major Divisions of the Brain

Telencephalon

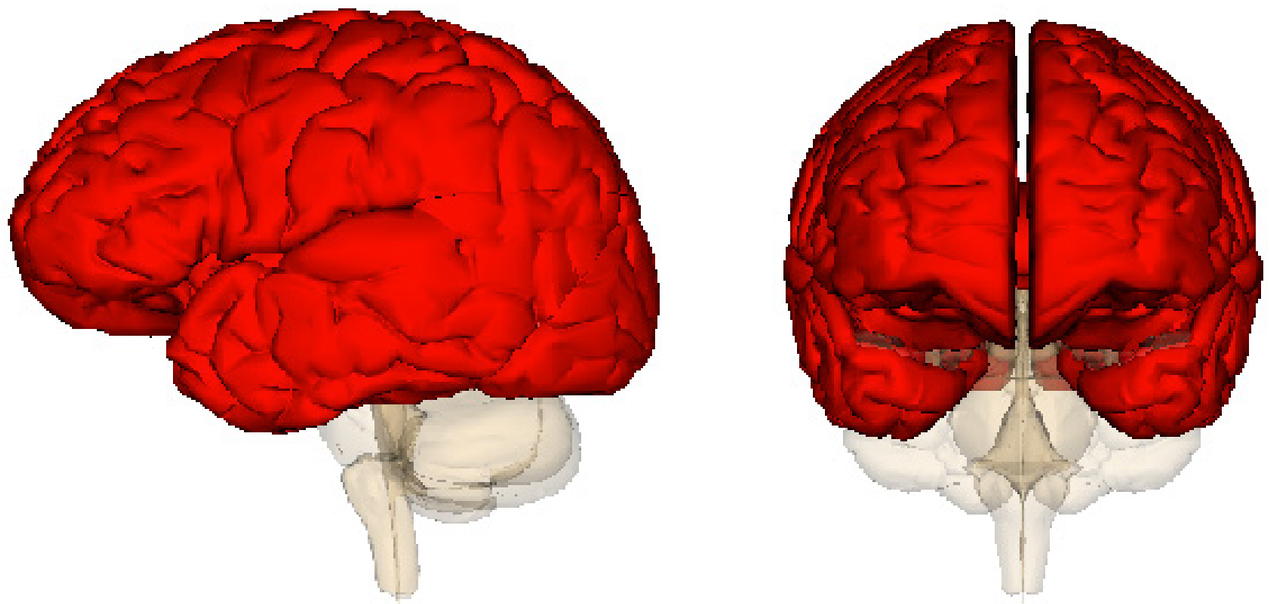


The largest division of the brain.

Major Divisions of the Brain

Telencephalon

The most prominent constituent of the telencephalon is the cerebral cortex.

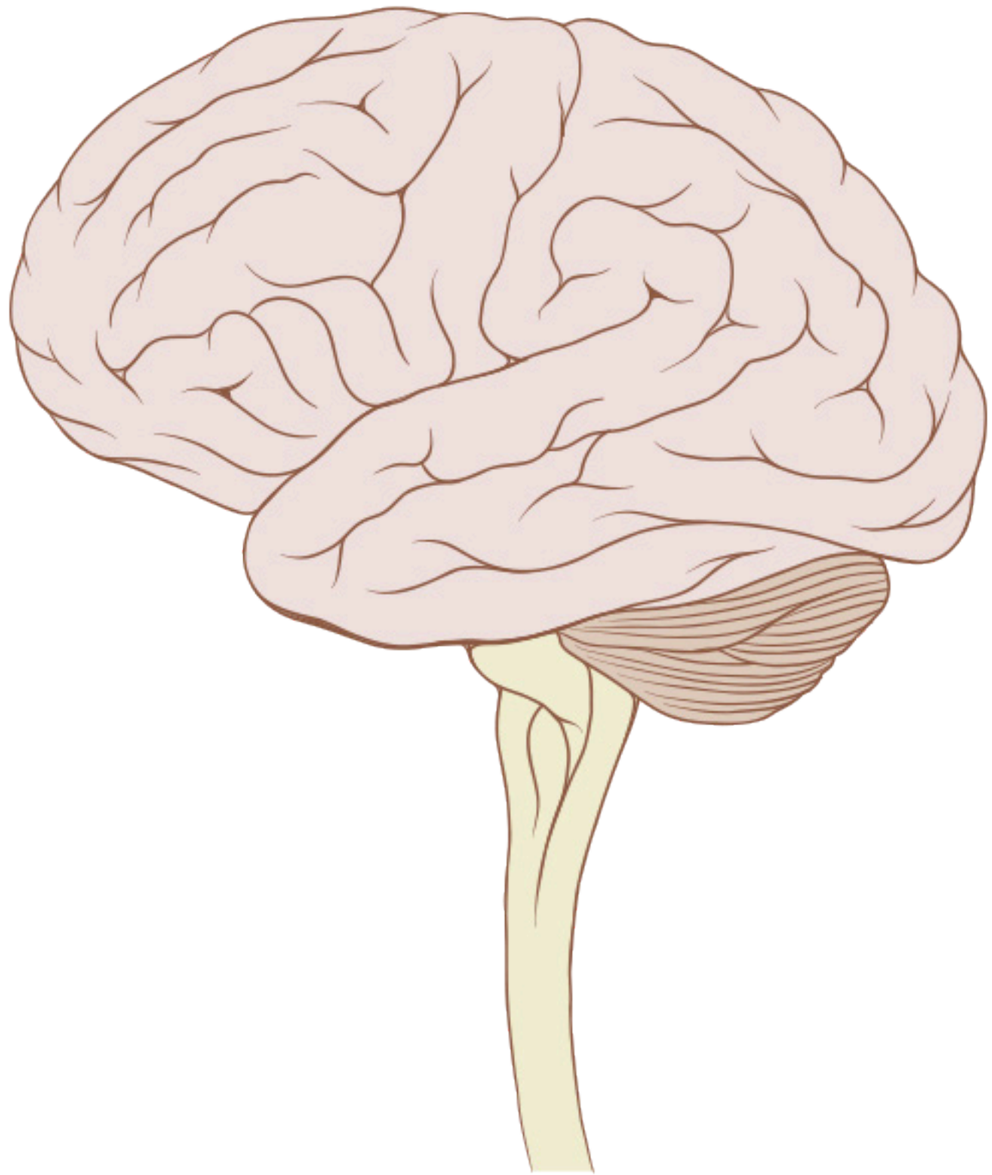


Major Divisions of the Brain

Telencephalon

The most prominent constituent of the telencephalon is the cerebral cortex.

The cortex is highly convoluted --convolutions increase the surface area while maintaining a small volume. The brains of humans are highly convoluted; many mammals are *lissencephalic* (smooth-brained).



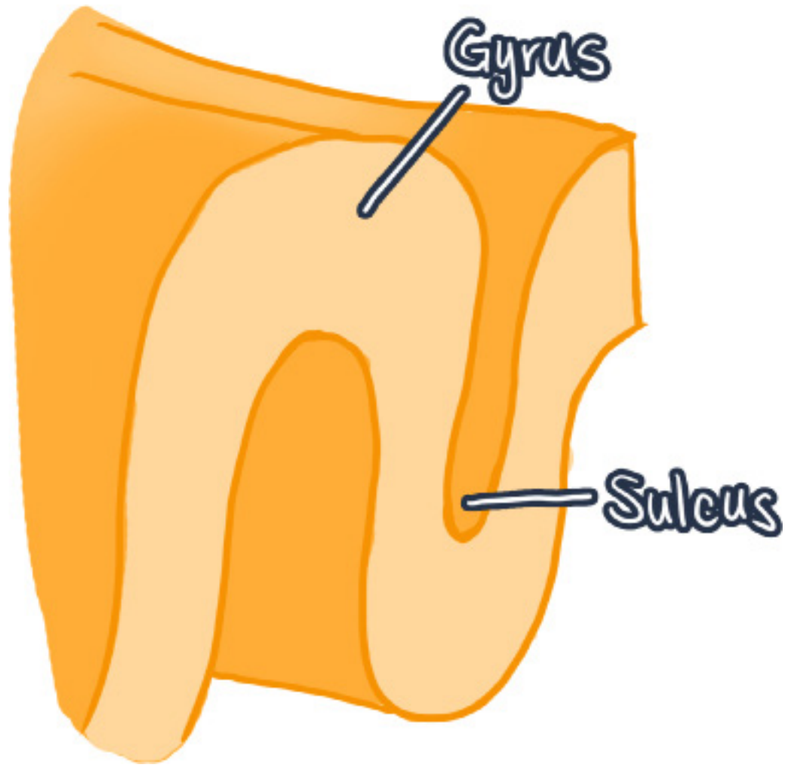
Major Divisions of the Brain

Telencephalon

The most prominent constituent of the telencephalon is the cerebral cortex.

The large furrows in the cortex are called fissures or sulci.

The ridges between the fissures are called gyri.

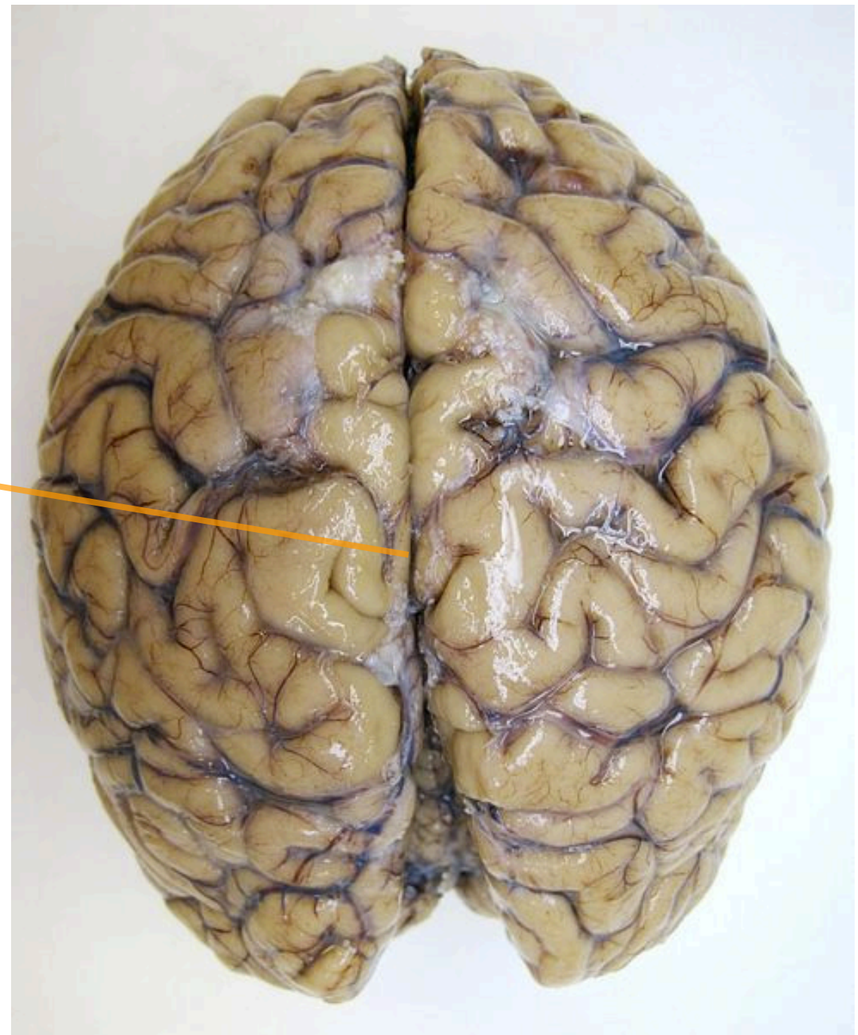


Major Divisions of the Brain

Telencephalon

The most prominent constituent of the telencephalon is the Cerebral Cortex.

The largest of all the fissures is the longitudinal fissure.



Major Divisions of the Brain

Telencephalon

The most prominent constituent of the telencephalon is the Cerebral Cortex.

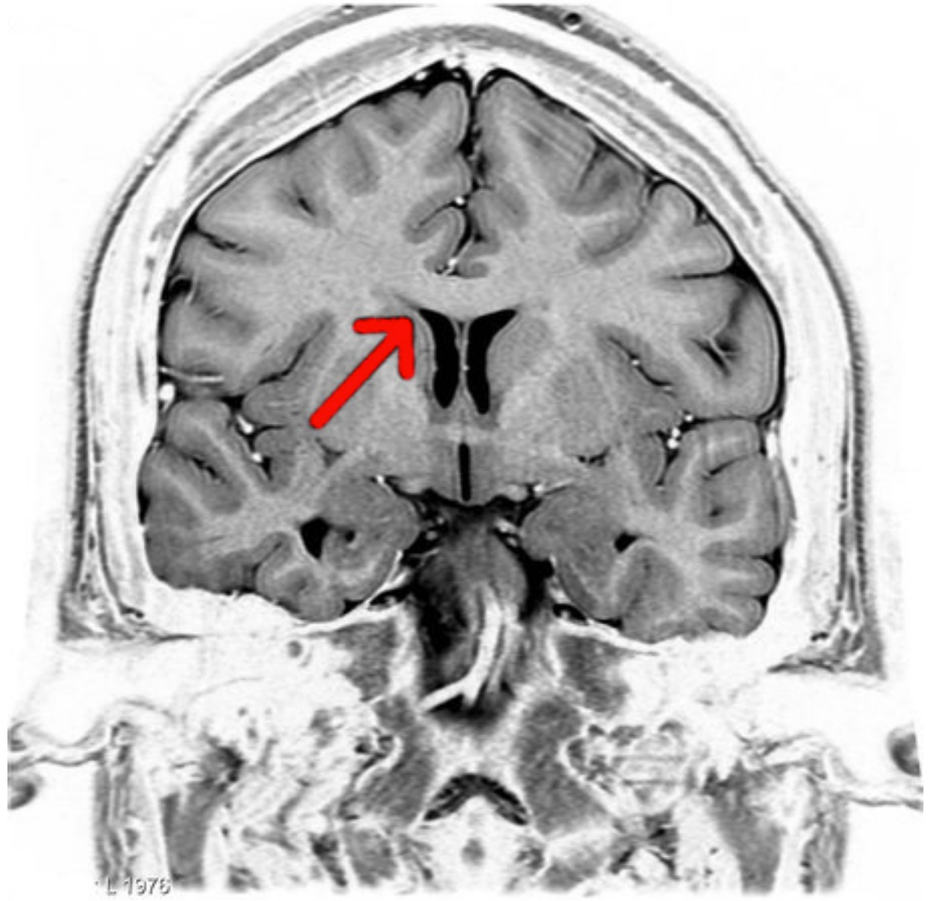
The cerebral hemispheres are connected by only a few tracts called the cerebral commissures. The largest is the corpus callosum.

Major Divisions of the Brain

Telencephalon

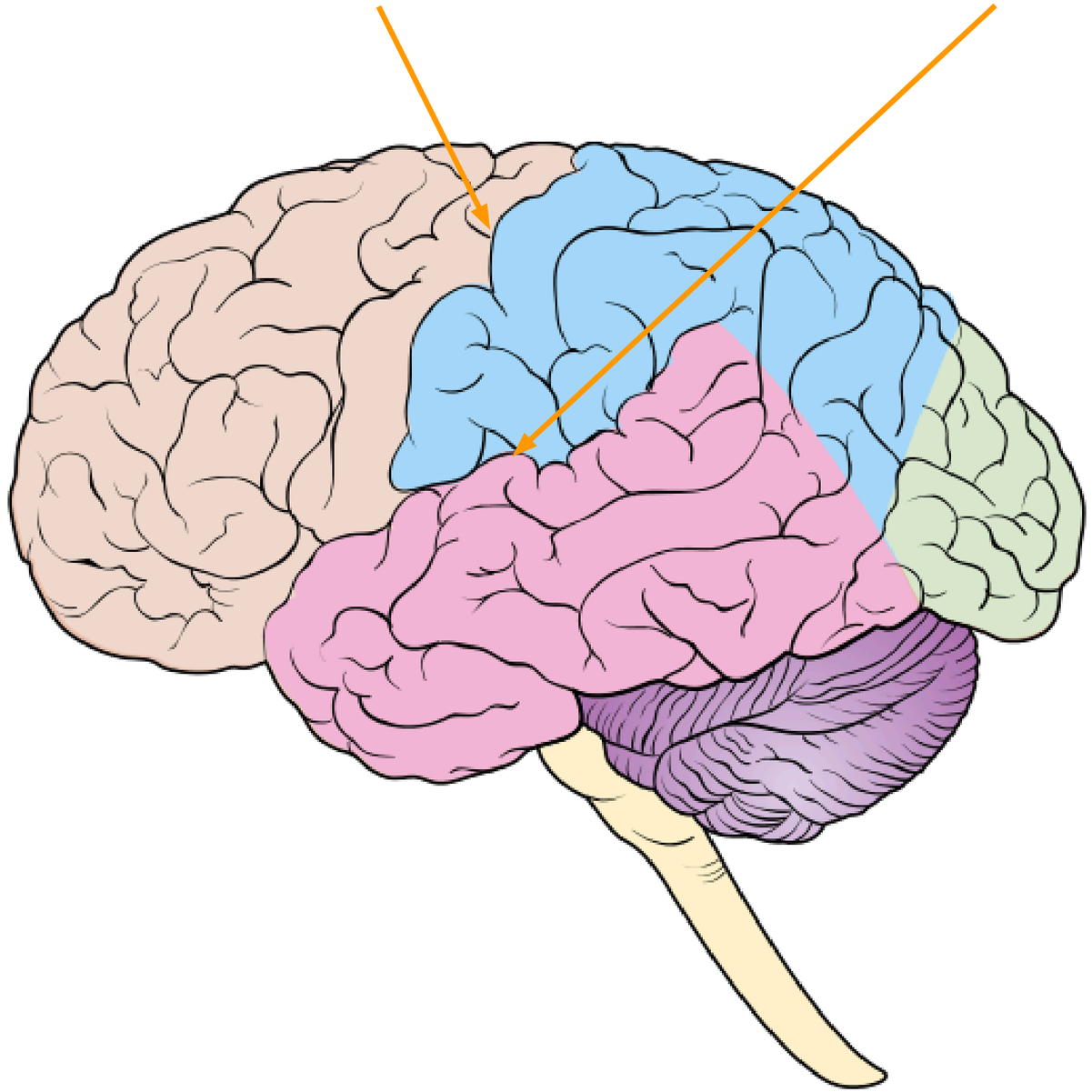
The most prominent constituent of the telencephalon is the Cerebral Cortex.

The cerebral hemispheres are connected by only a few tracts called the cerebral commissures. The largest is the corpus callosum.



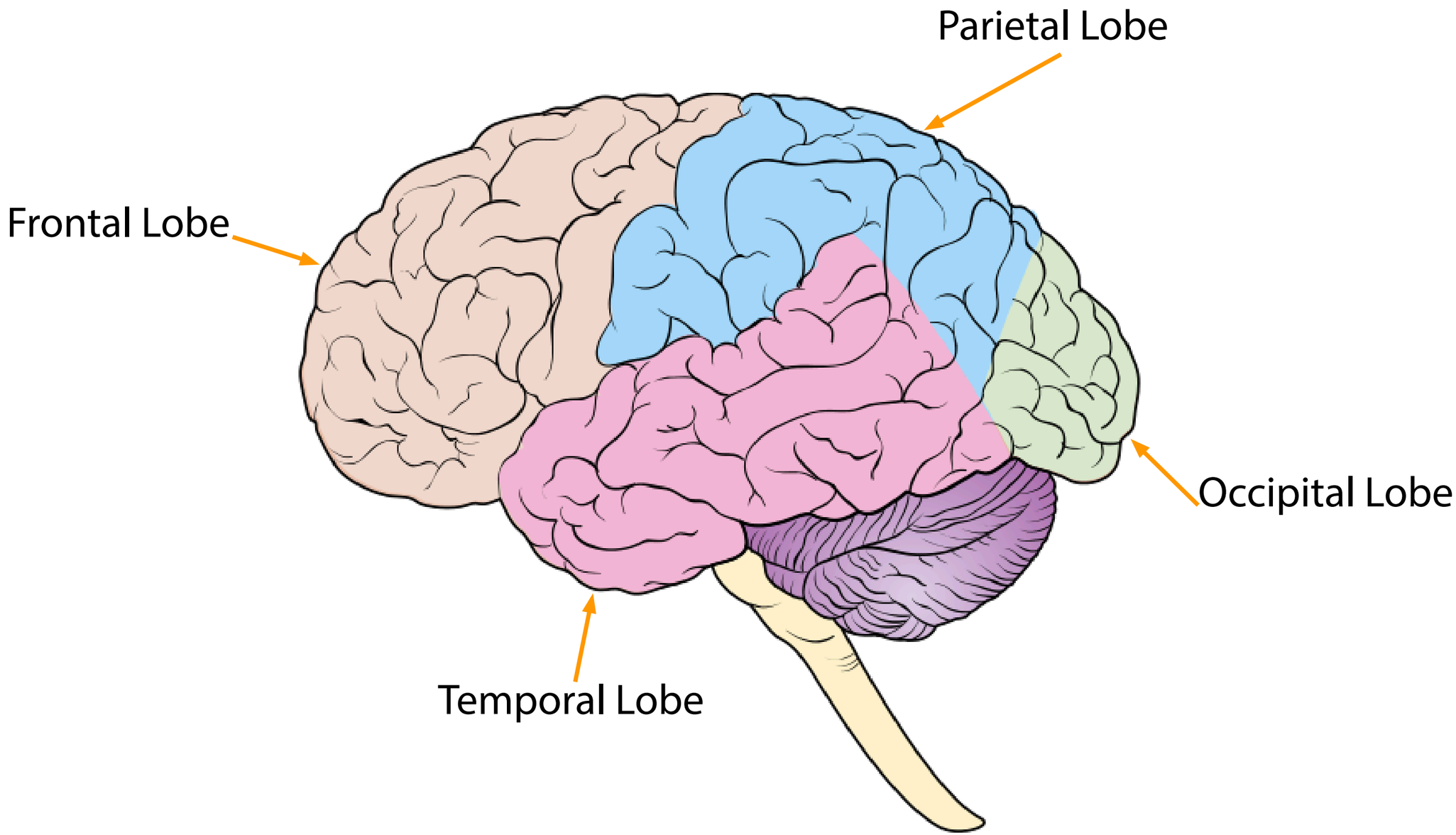
Major Divisions of the Brain

Two major landmarks: central fissure and lateral fissure.

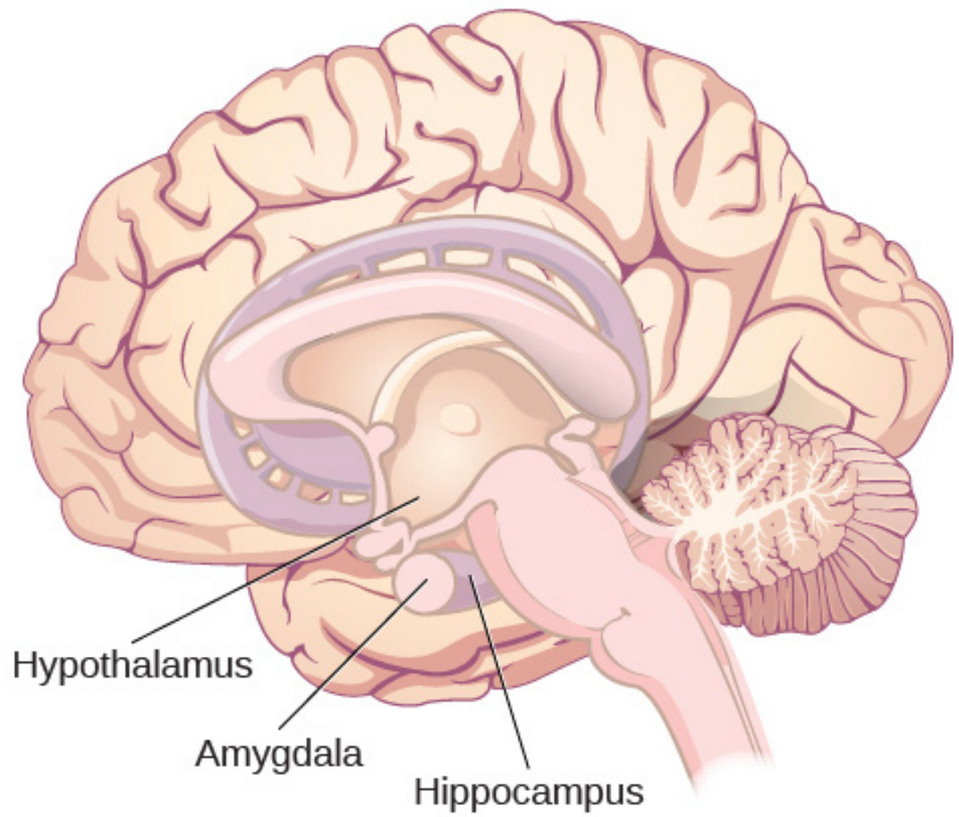


Lobes of the Cortex

Four lobes: Occipital, Temporal, Parietal, and Frontal.



Lobes of the Cortex



The Limbic System