

The Nervous System

The Brain

The Brain

97% of neural tissue in the human body

~1.4 kg

Brain size varies

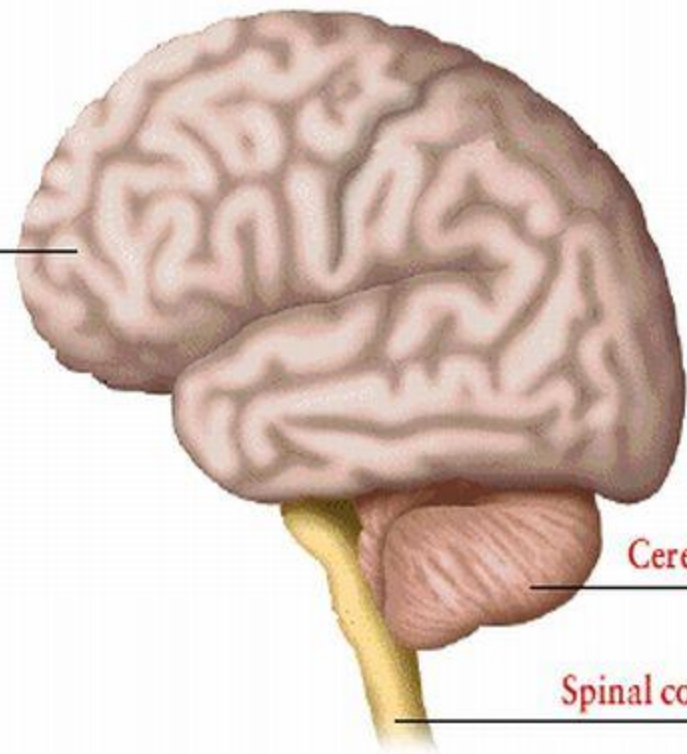
Male brains usually bigger than females due to body size

Brain size and intelligence have no correlation
(sorry guys)

Cerebrum

- Majority of brain
- Divided into Cerebral Hemispheres
- Contains gyri (ridges) & sulci (grooves/depressions)
 - increases surface area
- Origin of higher mental functions
 - Conscious thought, memory, complex movements

Cerebrum



Cerebellum

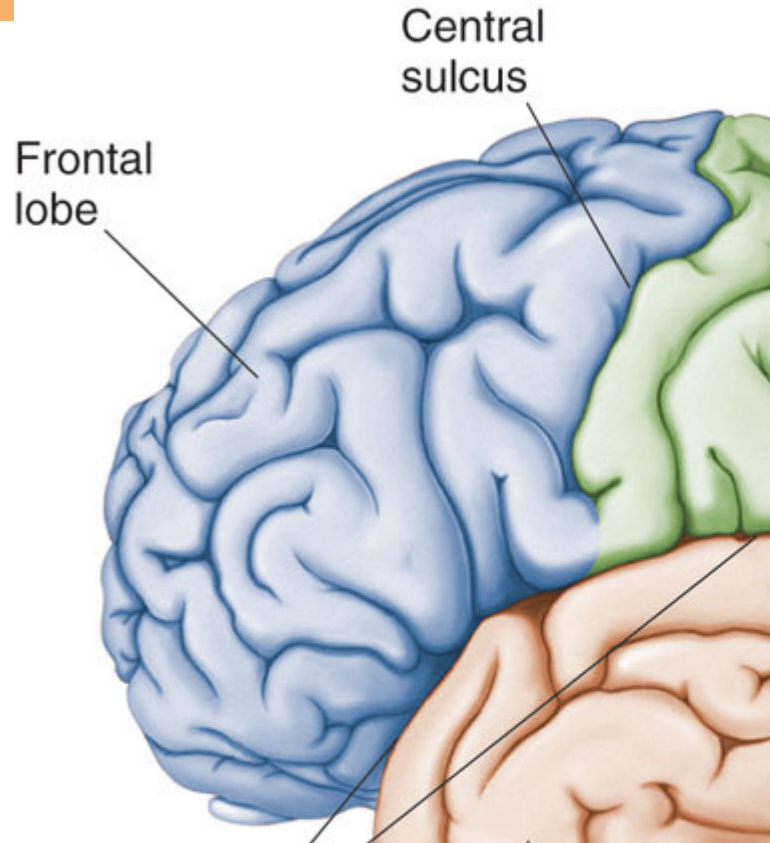
Spinal cord

Cerebral Hemispheres

- **Longitudinal Fissure**
 - separates left from right hemispheres
- **Central Sulcus**
 - separates anterior from posterior
- **Lateral Sulcus**
 - separates superior from inferior
- **Corpus Callosum**
 - communication fibers that separate the brain

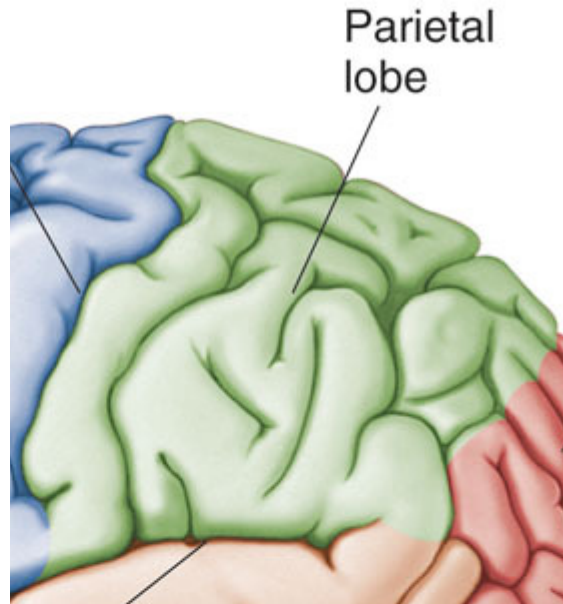
Frontal Lobe

Voluntary control
of skeletal muscles



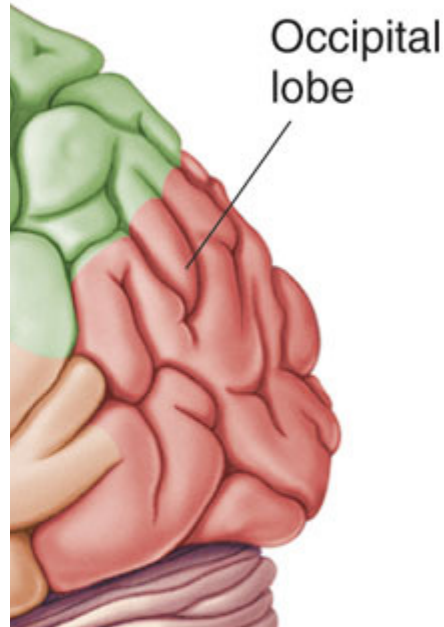
Parietal Lobe

Perception of senses such as touch, pressure, pain, vibration, taste, and temperature



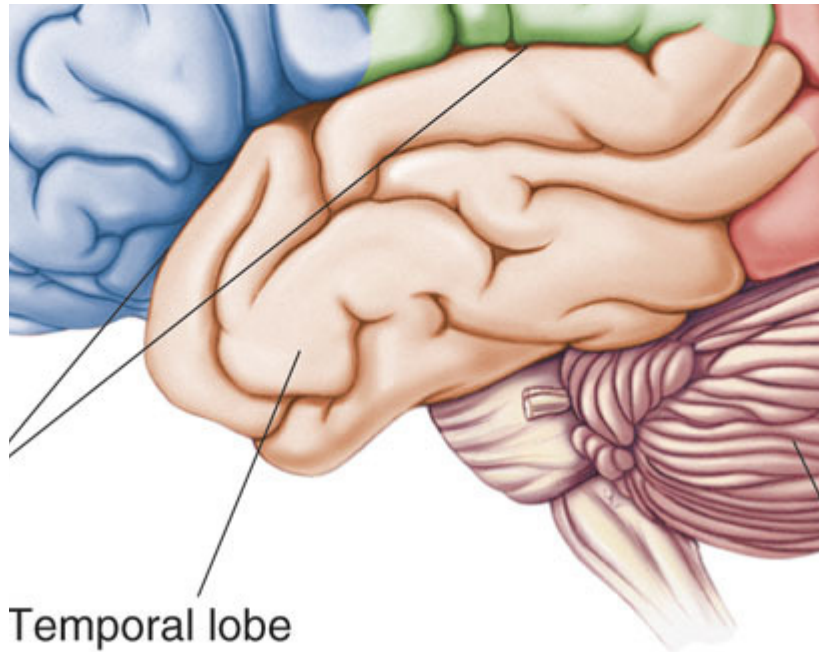
Occipital Lobe

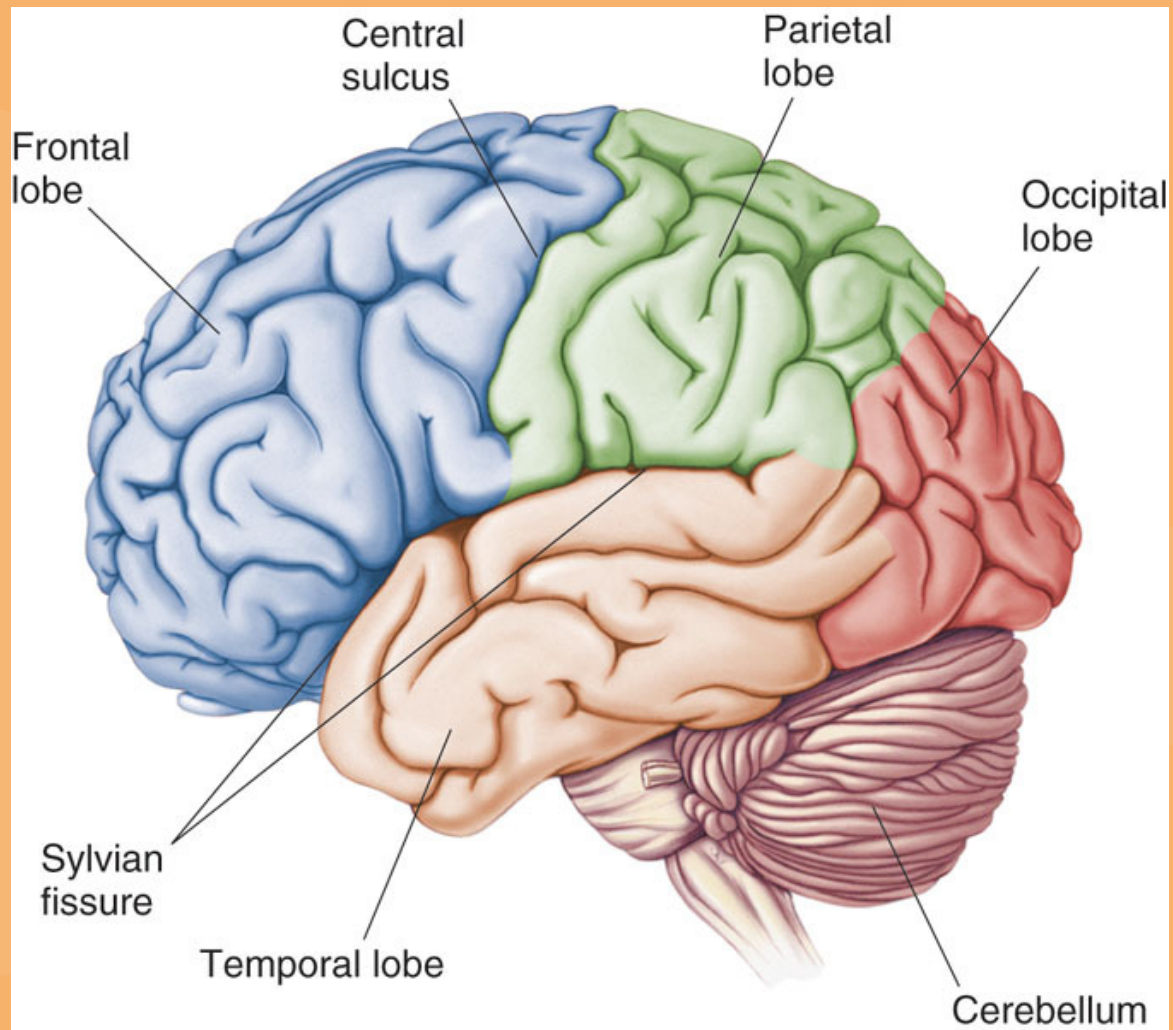
Visual perception



Temporal Lobe

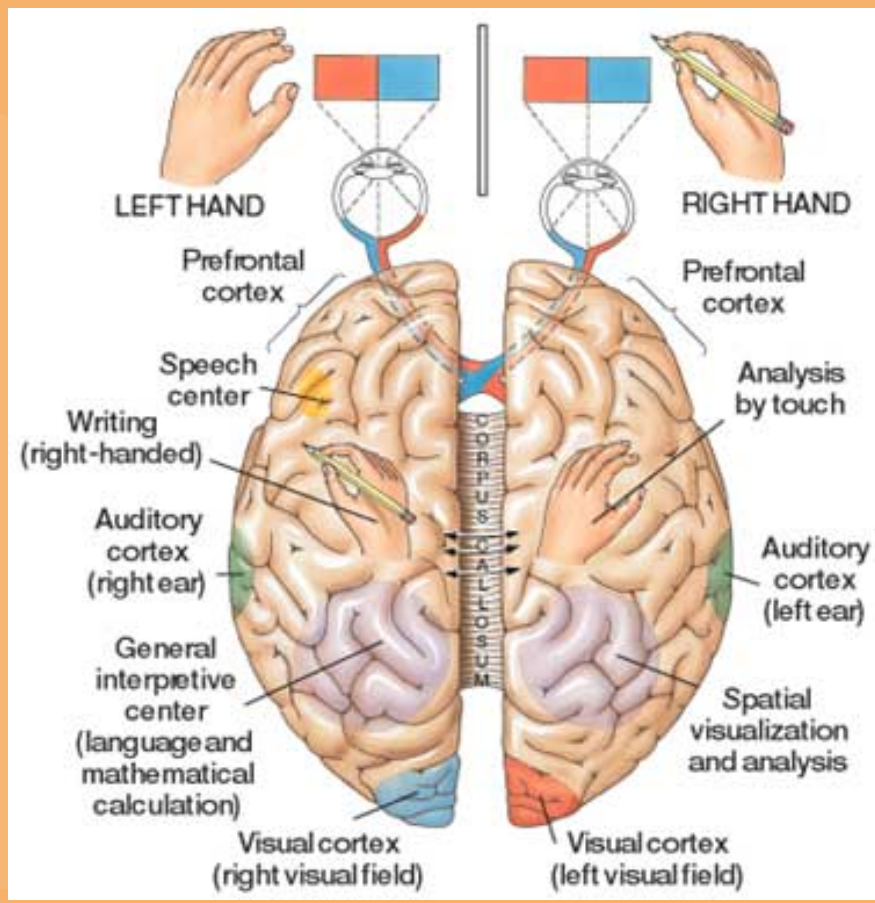
Perception of sound and smell





Right vs. Left

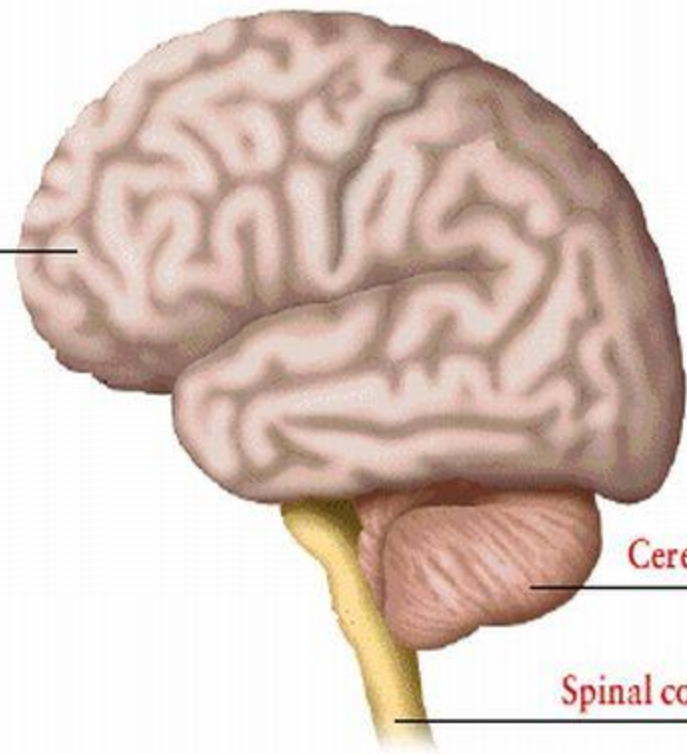
- The left hemisphere controls the right side of the body and the right hemisphere controls the left
- Hemispheric Lateralization
 - each hemisphere is responsible for specific functions



Cerebellum

- Processing center
- Adjusts postural muscles in the body
- Controls conscious and subconscious movements
- Receives and monitors information from the spinal cord
- Cerebellar cortex full of Purkinje Cells

Cerebrum

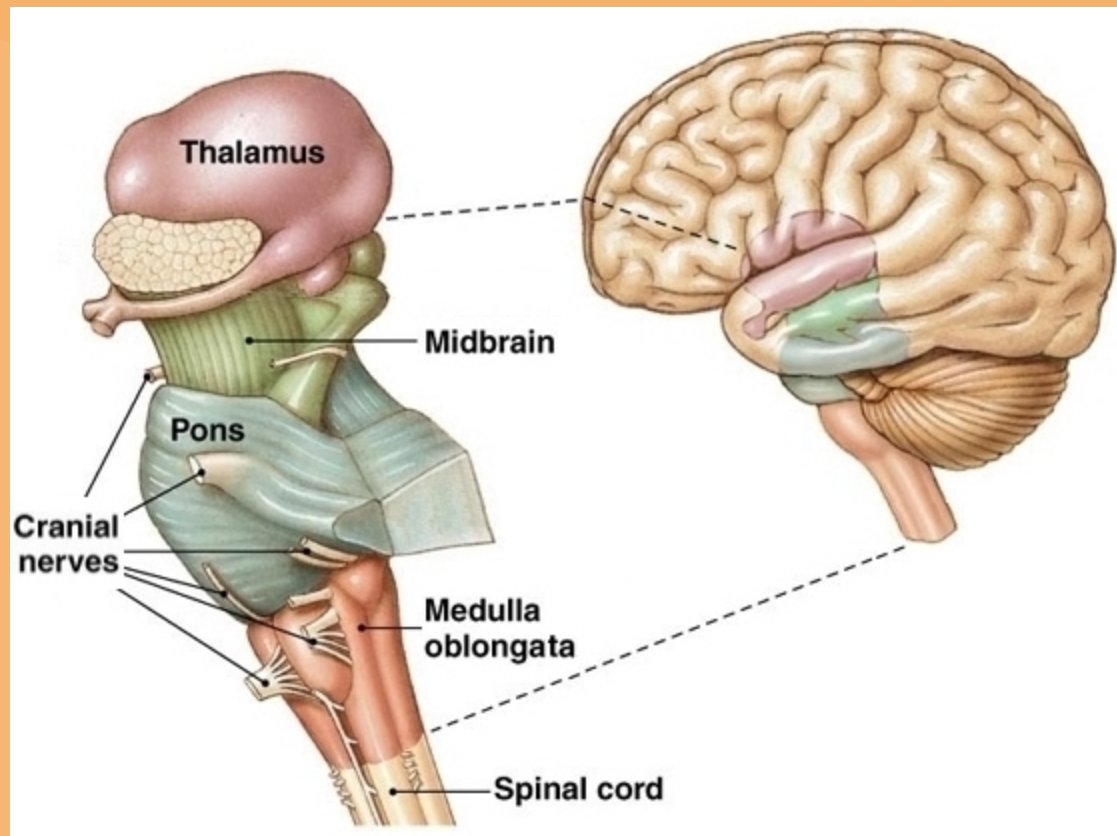


Cerebellum

Spinal cord

Medulla Oblongata

- Continuous with spinal cord
- Communication between brain & spinal cord
- Relays somatic & visceral sensory information
- Regulates heart & respiratory rate
- Regulates the distribution of blood



Pons

- Connect cerebellum to the cerebrum
- Relays sensory & motor information
- Can adjust respiratory center in medulla oblongata

Mesencephalon

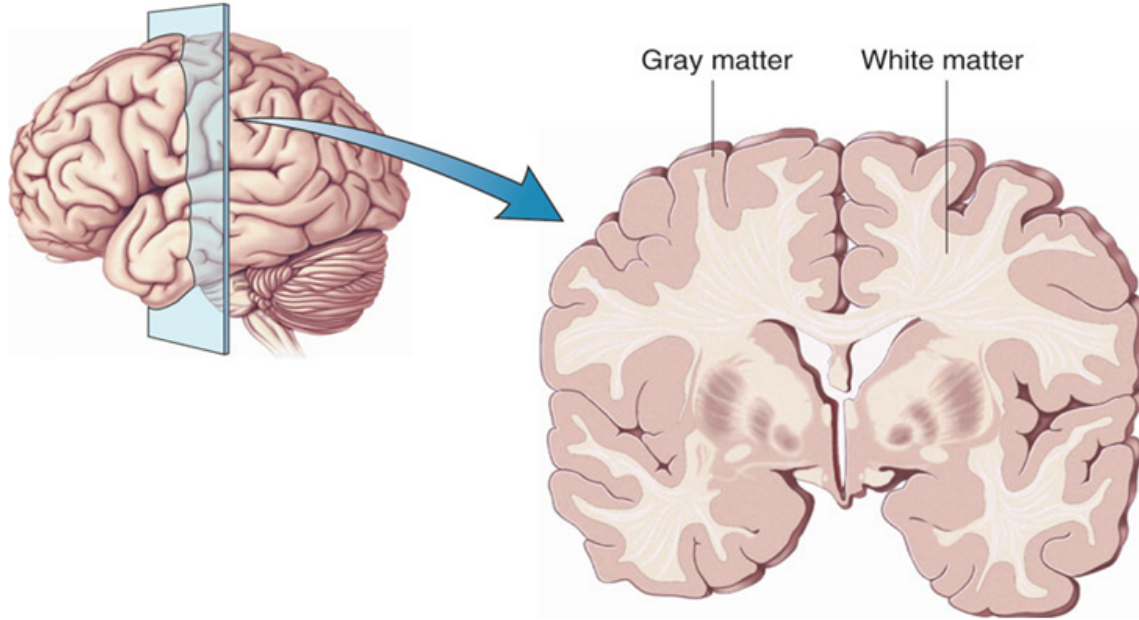
- Superior to pons
- Processes visual and auditory information
- Maintains consciousness

Diencephalon

- **Thalamus**
 - processes sensory information
- **Hypothalamus**
 - controls emotions, autonomic functions, & hormone production

Gray & White Matter

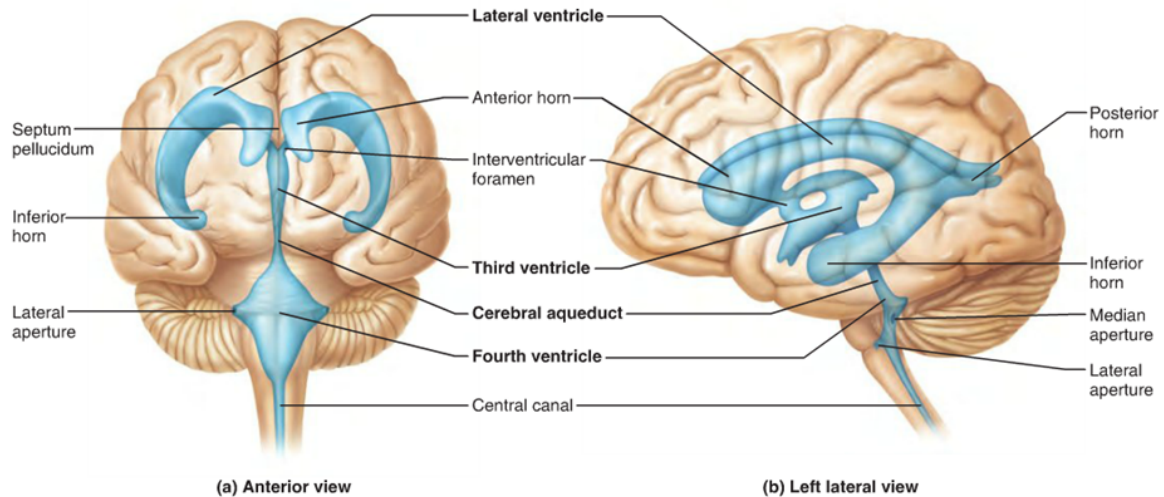
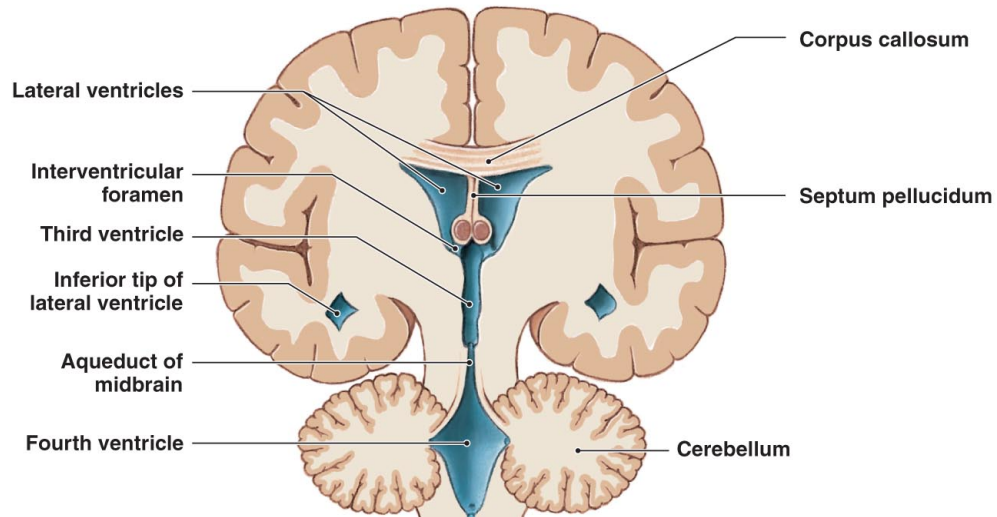
- The brain appears to be gray and white in color
- Gray coloring is due to non-myelinated neural axons
- White coloring is due to myelinated axons



Brain Ventricles

- Chambers filled with cerebrospinal fluid
 - continuously circulates
- Lateral Ventricle
 - each hemisphere
 - separated by septum pellucidum
- Third Ventricle
 - in the diencephalon
- Fourth Ventricle
 - between the pons & the cerebellum

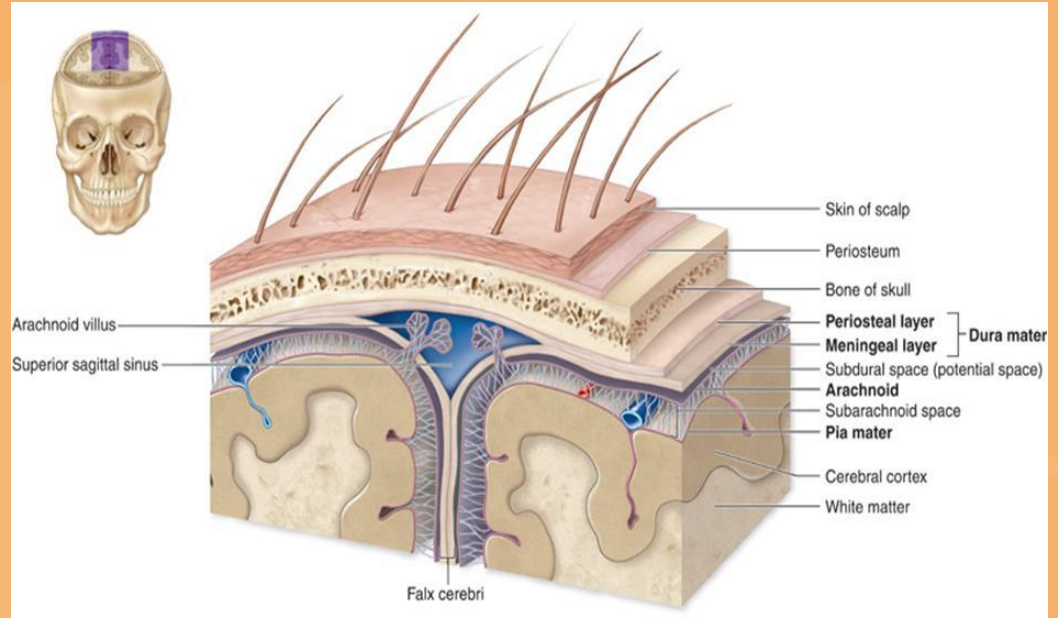
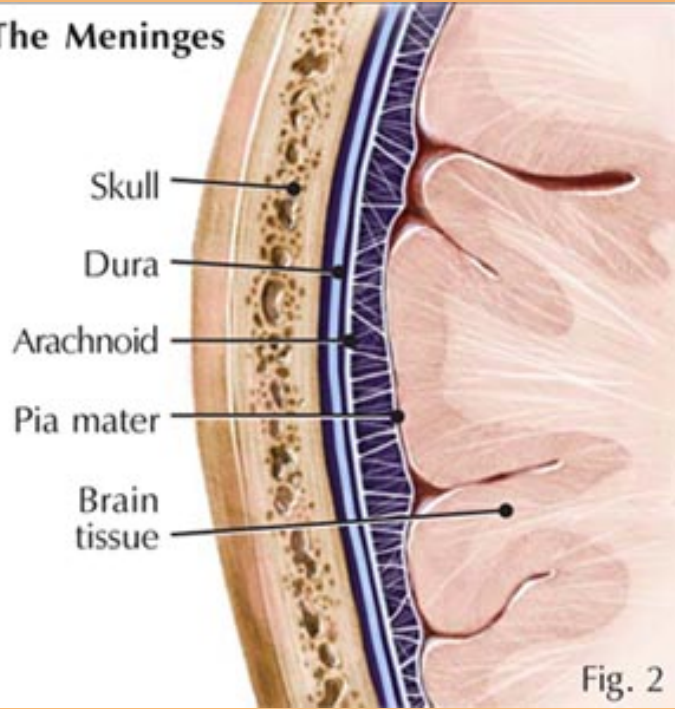
Two views of the ventricles, which are filled with cerebrospinal fluid



Meninges

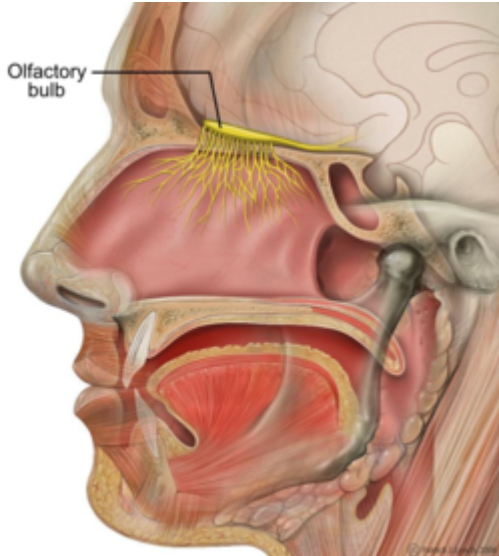
- The CNS has three meninges, or coverings
 - help protect the brain, spinal cord & cerebrospinal fluid
- Dura Mater
 - outermost layer, inside lining of skull
 - tough, fibrous
- Arachnoid
 - middle layer
 - spiderweb like fibers
- Pia Mater
 - innermost layer, lies directly on the brain

The Meninges

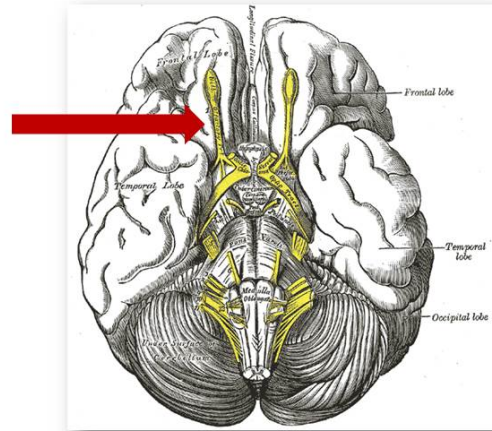


Olfactory Bulb

- Necessary structure to process olfactory information



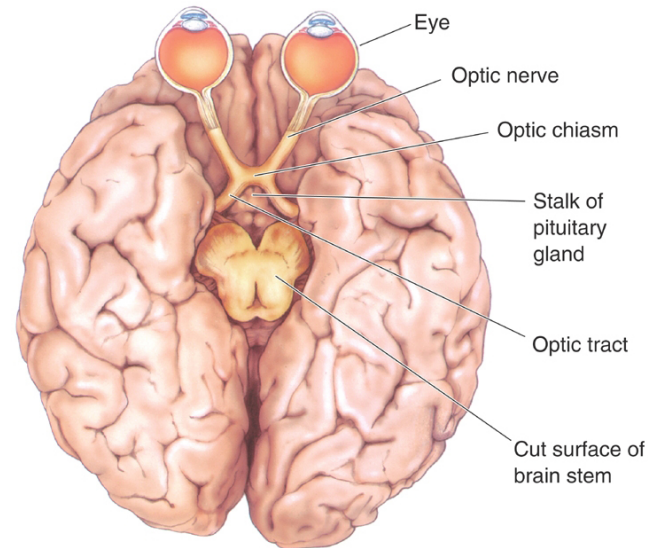
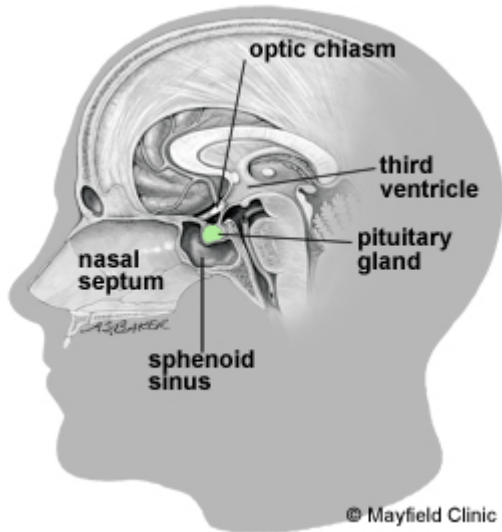
Olfactory Bulb



From the 20th Edition of Gray's Anatomy, 1918

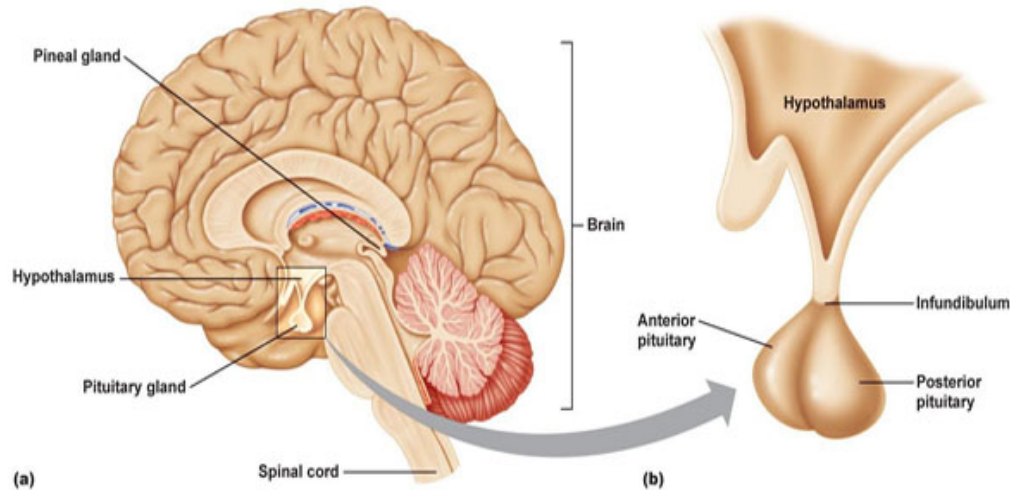
Optic Chiasm

- Place where optic nerves cross over, allowing the brain to process the whole visual field



Pituitary Gland

- Endocrine gland that controls many of the hormones, including those dealing with growth & blood pressure



Pineal Gland

- Endocrine gland that produces & releases melatonin, a hormone responsible for the sleep-wake cycle

