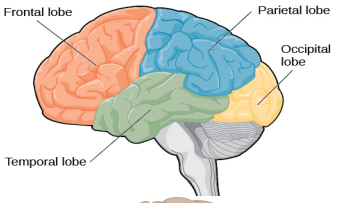
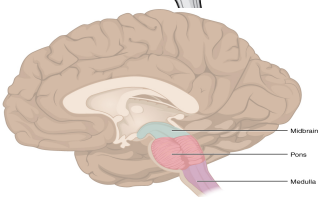
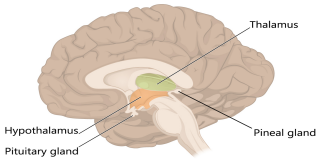
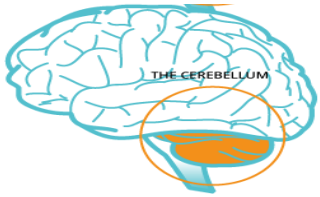
Worksheet: Intro to Nervous System

Parts of the Brain:



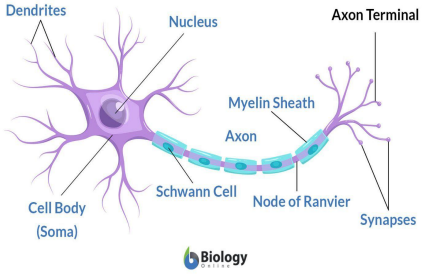






- Four Lobes
  - Frontal: cognitive functions, muscle movement, speech production
  - Parietal: processes information about temperature, taste, touch and movement
  - Temporal: processes auditory information and memories
  - Occipital: responsible for vision
- Brainstem
  - Medulla: Processes cranial nerve info & regulates heart/breathing rate
  - Pons: Regulates breathing & REM sleep
  - Midbrain: Motor/eye movement, auditory and visual processing
- Diencephalon
  - Hypothalamus: Regulates homeostasis, controls endocrine system
  - Thalamus: Sensory switchboard
  - Pituitary gland: Controls hormone secretion
  - Pineal gland: Secretes melatonin
- Cerebellum
  - "Little Brain"
  - Responsible for balance and coordination
  - Important in maintaining posture
  - Cerebellar ataxia: lack of voluntary coordination of muscle movements

Parts of the Neuron:



- Neurons are nerve cells
  - Neurons send and receive electrical signals
- Neurons are composed of three main parts: dendrites, a cell body, and an axon.
  - Signals are received through the dendrites, travel to the cell body and are processed, and continue down the axon until they reach the synapse (the communication point between two neurons)
- Nerve impulses are called action potentials
  - Action potentials are conducted down the axon.
  - Nodes of Ravier are essential for the proper functioning of the nervous system as they allow for the propagation of action potentials
  - Schwann cells are specialized cells that are found in the PNS and are responsible for producing myelin.
  - Myelin sheath helps the axon send the impulse rapidly
- Synapses are the sites at which information is carried from the first neuron (presynaptic) to the target neuron (postsynaptic)
  - Information is transferred using chemical messengers called neurotransmitters
  - Common neurotransmitters include dopamine, acetylcholine, serotonin, and glutamate

Sheep Brain Dissection

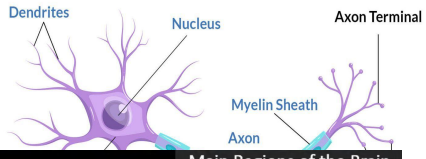
Orientation

- Anterior or rostral: front or towards the front
- Posterior or caudal: at or towards the back
- Lateral: on the side or towards the side
- Medial: at or towards the middle
- Dorsa: on top, in the brain and head only
- Ventral: on the bottom, in the brain and head only

Worksheet: Intro to Nervous System

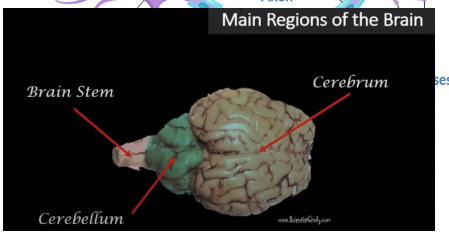
Removing the Dura Mater

1. Start at the anterior end and slide the scissors underneath the brain.
2. Cut through the dura mater up the mid-sagittal plane.
3. Continue making small cuts, being careful not to pull the dura mater off.

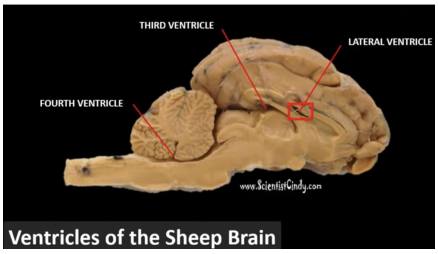


Dissection Walk-Through

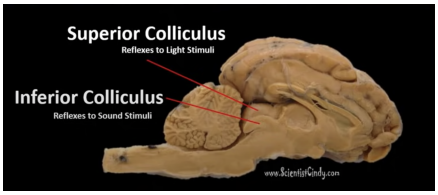
4. Introduction (Irene)
    a. There are 3 main regions of the brain:
        i. Cerebrum
            1. Cerebral cortex: contain gyri ("hilled" regions) and sucli ("valleys" or "grooves")
            2. Separated into the left and right hemispheres by the great longitudinal fissure
        ii. Cerebellum
            1. Separated from the cerebrum by the transverse fissure
        iii. Brain stem



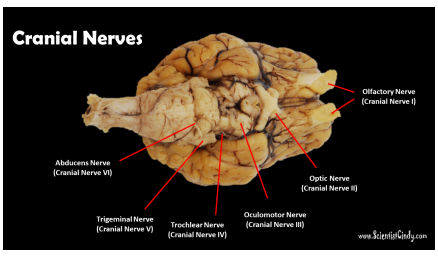
5. Lobes
6. Midsagittal structures & ventricles (Irene)
    a. Ventricles are fluid-filled spaces in the brain that are filled with cerebral spinal fluid.
        i. Produce and store cerebrospinal fluid which protects and cushions the brain and spinal cord from trauma
        ii. Removes waste, delivers nutrients, and maintains temperatures for your brain and spine
    b. Venticles include:
        i. Lateral ventricle
        ii. Third ventricle
        iii. Fourth ventricle



7. Corpus callosum (Aru)
8. Thalamus (Irene)
    a. The thalamus is the large area under the corpus callosum and is a relay center for sensory information.
    b. Behind the thalamus is a small circular region known as the pineal body, or pineal gland.
    c. On top is the superior colliculus, and underneath is the inferior colliculus
        i. Superior colliculus: reflexes to light stimuli
        ii. Inferior colliculus: reflexes to sound stimuli
    d. The area below is the hypothalamus, which controls the internal thermostat of the body, hunger, thirst, the fight or flight response, the rest and digest response, and mating behavior.



9. Midbrain, pons, cerebellum (Aru)
10. Cranial nerves (Irene)
    a. I. Olfactory (S)
    b. II. Optic (S)
    c. III. Oculomotor (M)
    d. IV. Trochlear (M)



e. V. Trigeminal (B)
f. VI. Abducens (M)
g. VII. Facial (B)
h. VIII. Vestibulocochlear (S)
i. IX. Glossopharyngeal (B)
j. X. Vagus (B)
k. XI. Accessory (M)
l. XII. Hypoglossal (M)