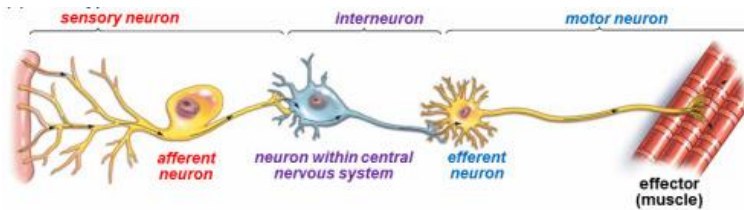
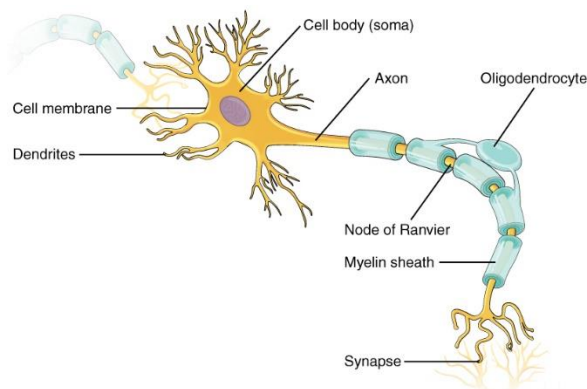


Nervous System

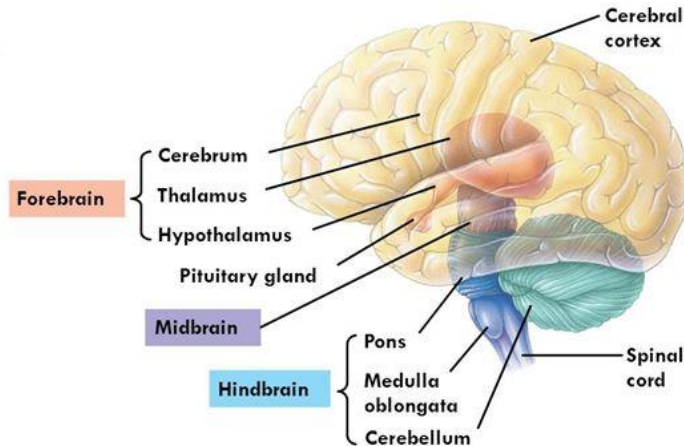
- Main function: senses, interprets, and commands responses (in that order) to conditions of our body
- Action potential
 - A process in which messages are sent across the plasma membrane of a neuron
 - Neuron: main nervous system cell
 - Only occurs when a stimulation passes a necessary threshold
 - Chemical synapse
 - Point of contact
 - Where a substance is released to either stimulate or inhibit the action of the adjacent cell
- Functional types of neurons
 - Sensory neurons
 - Transmit impulses to the CNS from the sensory receptors (touch, pain, hearing, sight, smell, and taste)
 - Motor neurons
 - Transmit impulses from the CNS to the rest of the body by signaling muscles or glands to respond
 - Interneurons
 - Transmit signals between neurons



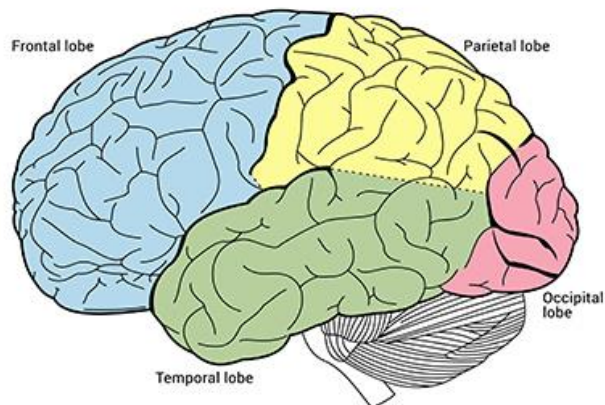
- Basic anatomy of neuron
 - Cell body/soma
 - Contains the nucleus of neuron
 - Axon
 - Transmits the info away from cell body
 - Insulated by myelin sheets (made by oligodendrocytes)
 - Terminates at the synapse
 - Dendrites
 - Receive info from sensory receptors or interneurons and transmit towards the body
 - Nodes of Ranvier
 - Gaps between myelinated axon



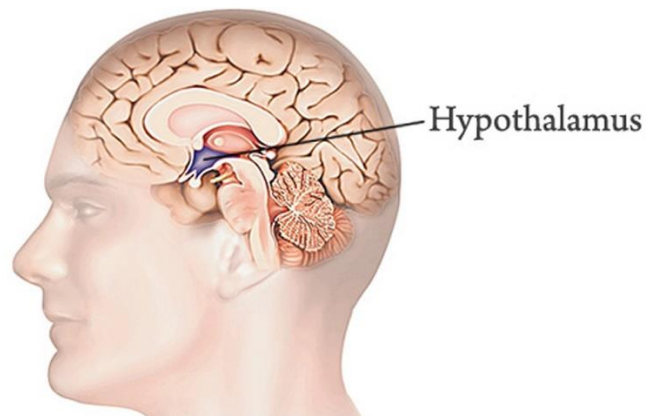
- Central nervous system: spinal cord and brain
 - Spinal cord
 - Encased in vertebrae –a bony structure that protects spinal cord
 - Responsible for limb movement and internal organ activity
 - Where major nerve tracts ascend or descend from spinal cord to brain
 - Brain
 - Made of hindbrain, midbrain, and forebrain



- Hindbrain: houses medulla oblongata, cerebellum, and pons
 - Midbrain: integration center of sensory signals which give appropriate responses to those signals
 - Forebrain: houses cerebrum, thalamus, and hypothalamus
 - Cerebral cortex
 - A thin layer of gray matter covering cerebrum
 - Hemispherical division
 - Left and right
 - Each hemisphere is responsible for specific things
 - Divided into 4 lobes
 - Frontal –area in front of the brain responsible for high executive functions (ex: memories, planning, decision making, etc.)
 - Parietal –area at the back of the brain and top of brain responsible for sensory input and proprioception
 - Temporal –area at the left and right side of brain responsible for auditory inputs
 - Occipital –area at the back of brain responsible for visual input



- Cerebellum
 - Responsible for processing and storing implicit memories - memories coming from classical conditioning
- Brain stem
 - Posterior of the brain made of midbrain, pons, and medulla
 - Important area where passage of info between body and brain occurs
 - Regulates respiratory, digestive, and circulatory functions
- Midbrain
 - Made of tectum, tegmentum, and ventral tegmentum
 - Responsible for vision and hearing
- Pons
 - Area where info is exchanged between midbrain and cerebellum
- Medulla oblongata
 - Connection point between spinal cord and brain
 - Plays an important role in circulatory and respiratory systems
- Peripheral nervous system
 - Consists of nerves and ganglia
- Autonomic nervous system
 - Maintains homeostasis by controlling functions of internal organs, blood vessels, smooth muscles, and glands
 - Hypothalamus
 - The main control center which regulates heart rate, breathing rate, body temperature, and blood pH

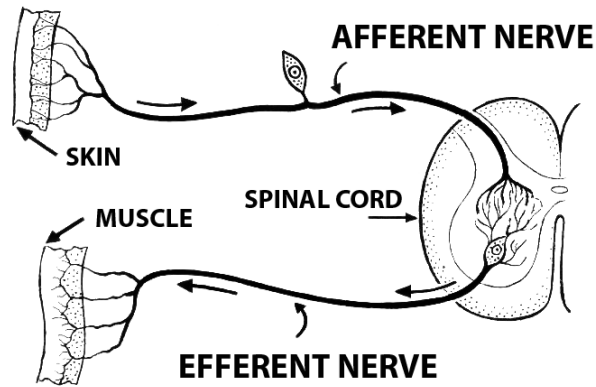


- Divided into 2 parts
 - Sympathetic controls when the body is in stress -“flight or fight”
 - Parasympathetic maintains body’s homeostasis (counter effect of sympathetic)
- Somatic nervous system
 - Controls our five senses and skeletal muscles



- This is why SNS has all the neurons connected to sense organs
- Skeletal muscles are responsible for reflex arc

- Efferent nerves vs afferent nerves



- Efferent: sensory nerves that bring signals from the CNS to the sensory organs
- Afferent: motor nerves that bring signals from the sensory organs and muscles towards the CNS
- Reflex arc
 - Simple nerve pathway that bypasses the brain and is controlled by the spinal cord
 - Examples: knee-jerk response/patellar tendon reflex
 - Stimulus → sensory receptors activated → sensory neuron carries info → interneuron → motor neuron → effector (muscle)

