Nervous System

Path of signal transmission through reflex arc

Receptor ----> sensory (afferent) neuron ----> interneuron ----> motor (efferent) neuron ----> effector (muscle or gland)

Path of sound though the ear

Pinna ----> auditory canal ----> tympanic membrane ----> malleus ----> incus ----> stapes ----> oval window ----> cochlea ----> cochlear nerve

Path of light through the eye

Cornea ----> aqueous humor ----> pupil ----> lens ----> vitreous humor ----> retina ----> optic nerve

Parts of the brain and their functions

Ventricles: interconnecting spaces in the brain that contain cerebrospinal fluid (CSF)
Cerebrum: The cerebrum is the largest and most complex part of the brain. The cerebrum consists of the right and left cerebral hemispheres. The white matter that connects the cerebral hemispheres is called the **corpus callosum**. The cerebrum is also divided into several lobes: the **frontal lobe**, the **occipital lobe**, the **parietal lobe**, and the **temporal lobe**.

- **Frontal Lobe**: controls motor functions and permits voluntary muscle control; it is responsible for thought, intellect, problem-solving, language, and smell.
- **Parietal Lobe**: interprets general sensory information (pain, touch, tickle, itch, and pressure) as well information regarding taste
- **Occipital lobe**: interprets visual information
- **Temporal lobe**: interprets auditory (hearing) information

Cerebellum: commonly called "the little brain"; controls balance, posture and coordination; coordinates balance and skeletal muscle activity to produce smooth movements

Brain Stem: This part of the brain is attached to the spinal cord. It acts as a sensory filter, selecting information that is passed on to other regions of the brain. It is composed of the **midbrain**, **pons**, and **medulla oblongata**.

- **Midbrain:** involved in visual and auditory reflexes
- **Pons***:* helps the medulla oblongata control respiration
- **Medulla oblongata***:* essential portion of the brain stem which maintains vital body functions such as blood pressure, heart rate, and breathing

Diencephalon: The portion of the brain where the third ventricle is located. This area contains the hypothalamus and thalamus.

- **Thalamus**: serves as a relay station for sensory information going to the cerebral cortex; sometimes called “the gatekeeper of the cerebrum”
- **Hypothalamus**: controls appetite, body temperature, water balance, and thirst; secretes hormones; it is primarily responsible for homeostasis; it also control the pituitary gland
- **Pineal gland (body)**: produces the hormone melatonin; timekeeping hormone that regulates the biological clock; regulates sleep cycle

Pituitary gland (hypophysis): controls the endocrine system through its control of other endocrine organs; sometimes called the master gland; composed of two parts the adenohypophysis (anterior pituitary) and the neurohypophysis (posterior pituitary)

Optic chiasma: an X-shaped structure formed by the partial cross-over of some optic nerves as they enter the brain

Olfactory bulb: involved in the sense of smell; relays sensory information regarding smell to the olfactory tract

Cardiovascular System

Path of blood through the heart

Inferior or superior vena cava----> right atrium ----> tricuspid valve ----> right ventricle ----> pulmonary semilunar valve----> pulmonary trunk ----> right and left pulmonary arteries----> lungs ----> right and left pulmonary veins ----> left atrium ----> bicuspid (mitral) valve ----> left ventricle ----> aortic semilunar valve ----> aorta ----> major systemic (tissue) arteries of the body