Chapter 12: The Nervous System

Central Nervous System (CNS): the brain and spinal cord.

Peripheral Nervous System (PNS): the nerves that enter and leave the brain and spinal cord (the CNS). It consists of the autonomic and somatic nervous systems.

Grey Matter: brownish-grey nerve tissue consisting mainly of nerve cell bodies within the brain and spinal cord.

White Matter: the whitish nerve tissue of the brain and spinal cord, consisting mostly of myelinated nerve fibres.

Autonomic Nervous System: the part of the nervous system that relays the information to internal organs that are not under conscious control of the individual. The system is made up of the sympathetic and parasympathetic nervous systems.

Somatic Nervous System: the part of the nervous system that relays information to and from skin and skeletal muscles that are under conscious control of the individual.


Parasympathetic Nervous System: the network of nerves that counteracts the sympathetic nervous system to slow the heart and breathing rates and relax muscles.

Reflex: a very quick, involuntary and muscle reaction to an outside stimulus.

Neuron: the nerve cell that is the structural and functional unit of the nervous system, consisting of a nucleus, cell body, dendrites, axons, and a myelin sheath.

Nerve: message pathway of the nervous system, made up of many neurons connected together.

Reflex Arc: the nerve path that leads from a stimulus to a reflex action.

Cell Body: the main part of a neuron, containing the nucleus, and other organelles.

Dendrite: the primary site on a nerve cell (neuron) for receiving signals from other neurons.

Axon: long, cylindrical extension of a neuron's cell body that can range from 1mm to 1m in length. It transmits impulses along its length to the next neuron.

Medulla Oblongata: structure attached to the spinal cord at the base of the brain; has cardiac, vasomotor, respiratory, vomiting, coughing, hiccupping and swallowing functions.

Cerebellum: the part of the brain that controls muscle coordination.

Thalamus: sensory relay center of the brain that governs the flow of information from all other parts of the nervous system.

Hypothalamus: the part of the brain that acts as the main control center for the autonomic nervous system, re-establishes homeostasis, and controls the endocrine hormone system.

Cerebrum: the largest part of the brain, in which all the information from the senses is sorted and interpreted, voluntary muscles are stimulated, memories are stored and decisions are made.
Cerebral Cortex: the thin layer of grey matter that covers each hemisphere of the brain, enabling the individual to experience sensation, perform voluntary movements and think.

Corpus Callosum: layer of white matter made up of axons that joins the two hemispheres of the cerebral cortex of the brain.

Resting Potential: the difference in charge from the inside to the outside of a cell at rest. It is approx. -70mV

Neurotransmitters: chemicals that are secreted by neurons to stimulate motor neurons and central nervous system neurons.

Action Potential: in an axon the change in charge that occurs when the gates of the K+ channels close and the gates of the Na+ channels open after a wave of depolarization is triggered.

Refractory Period: the brief time between the triggering of an impulse along an axon and the axon's readiness for the next impulse. During this brief time the axon cannot transmit an impulse.

Myelin Sheath: the fatty layer around the axon of a nerve cell composed of Schwann cells.

Schwann Cell: insulating cells around the axon of a nerve cell.

Node Of Ranvier: the gap between the schwann cells around the axon of a nerve cell. The membrane of the axon is exposed and nerve impulses jump from one node of ravier to the next.

Synapse: junction between a neuron and another neuron or muscle cell.

Presynaptic Neuron: the state of a neuron before a synapse - before the neuron carries a wave of polarization leading to another nerve cell.

Postsynaptic Neuron: the state of a neuron after a synapse - after the neuron receives and transmits a stimulus.

Synaptic Vesicle: specialized vacuole in the bulb-like ends of the axons of a nerve cell containing neurotransmitters that are released into the synapse when a nerve impulse is received.

Excitatory Response: process in which the neurotransmitter reaches the dendrites of a postsynaptic neuron, and a wave of depolarization is generated by the resultant opening of sodium gates.

Inhibitory Response: process in which the postsynaptic neuron is made more negative on the inside to raise the threshold of the stimulus.

Cholinesterase: enzyme that breaks down the neurotransmitter acetylcholine.

Acetylcholine: the primary neurotransmitter of the synaptic of both the somatic nervous system and the parasympathetic nervous system.

Noradrenaline: the primary neurotransmitter of the sympathetic nervous system. Also known as norepinephrine.

Glutamate: neurotransmitter in the cerebral cortex that accounts for 75% of all excitatory transmissions in the brain.

GABA: gamma aminobuturic acid, the most common inhibitory transmitter of the brain.

Dopamine: neurotransmitter that elevated mood and controls skeletal muscles.
Serotonin: organic compound formed from tryptophan and found in the tissue throughout the body. It acts as a neurotransmitter constricts blood vessels at injury sites and effects emotional states.

Multiple Sclerosis (MS): a serious progressive disease of the central nervous system. The myelin sheath surrounding the nerve cells becomes inflamed or damaged, disrupting the nerve impulses that are normally produced.

Alzheimer’s Disease: a degenerative disorder that affects the brain and causes dementia, which is an impairment of the brain’s intellectual functions such as memory and orientation, especially late in life.

Parkinson’s Disease: a chronic movement disorder caused by the gradual death of the neurons that produce dopamine.

Meningitis: a bacterial or viral infection of the meninges, the three membranes that cover and protect the brain and spinal cord.

Sclera: the thick, white, outer layer that gives the eye its shape.

Cornea: the clear part of the sclera at the front of the eye.

Conjunctiva: the thin, transparent membrane that covers the cornea and is kept moist by tears.

Choroid layer: the middle layer of the eye, which absorbs light and prevents internal reflection. The layer forms the iris at the front of the eye.

Iris: the muscle that adjusts the pupil to regulate the amount of light that enters the eye.

Pupil: the aperture in the middle of the iris of the eye. The side of the aperture are adjusted to control the amount of light.

Lens: in the eye, the clear, flexible muscle that adjusts the pupil to regulate the amount of light that enters the eye.

Retina: the innermost layer of the eye.

Rods: photoreceptors in the eye; more sensitive to light than cones, but unable to distinguish color.

Cones: color receptors in the eye.

Accommodation: in the eye, adjustment that the ciliary body makes to the shape of the lens to focus on objects at varying distances.

Fovea Centralis: concentration of cones on the retina located directly behind the centre of the lens.

Round Window: one of the two small opening at the end of the middle ear.

Malleus: one of the three small bones between the tympanic membrane (eardrum) and the oval window fo the middle ear, that transmit sound waves from the eardrum to the inner ear.

Incus: one of the three small bones between the tympanic membrane (eardrum) and the oval window fo the middle ear, that transmit sound waves from the eardrum to the inner ear.

Stapes: one of the three small bones between the tympanic membrane (eardrum) and the oval window fo the middle ear, that transmit sound waves from the eardrum to the inner ear.
Ossicles: the group of three small bones (malleus, incus, and stapes) and the oval window of the middle ear, that transmit sound waves from the eardrum to the inner ear.

Eustachian Tube: bony passage extending from the middle ear to the nasopharynx that plays a role in equalizing air pressure on both sides of the eardrum.

Inner Ear: one of the three separate segments of the ear. Consists of three sections: cochlea, vestibule and semicircular canals.

Cochlea: one of the three sections of the inner each (cochlea, vestibule and semicircular canals); involved in hearing.

Vestibule: one of the three sections of the inner each (cochlea, vestibule and semicircular canals); involved in balance and equilibrium.

Semicircular Canals: one of the three sections of the inner each (cochlea, vestibule and semicircular canals); three tubes involved in maintaining balance.

Vestibular Canal: one of the three canals in the cochlea; joins the tympanic canal and leads to the round window.

Cochlear Canal: one of the three canals in the cochlea.

Tympanic Canal: one of the three canals in the cochlea of the ear.

Basilar Membrane: one of the two parallel membranes that comprise the organ of corti in the inner ear; forms the lower wall of the cochlear canal.

Tectorial Membrane: one of two parallel membranes that comprise the organ of corti in the inner ear. During the transmission of sound waves, the basilar membrane vibrates, causing the sensory hairs to flex against the tectorial membrane.

Cataract: cloudy, or opaque, area on the lens of the eye that increases in size over time and can lead to blindness if not medically treated.

Glaucoma: build-up of aqueous humor in the eye that irreversibly damages the nerve fibres responsible for peripheral vision.

Myopia: near-sightedness, or difficulty seeing things that are nearby. The condition is caused by too-strong ciliary muscles or too-long eyeball.

Hyperopia: far-sightedness, or difficulty seeing things that are nearby. The condition is caused by weak ciliary muscles or a too-short eyeball.

Astigmatism: abnormality in the shape of the cornea or lens that results in uneven focus.

Outer Ear: one of the three separate segments of the ear. Consists of the pinna and the auditory canal.

Middle Ear: one of the three separate segments of the ear. The middle ear begins at the tympanic membrane (eardrum) and ends at the two small openings called the round window and the oval window.

Tympanic Membrane (Eardrum): a membrane of thin skin, and fibrous tissue that vibrates in response to sound waves, located between the outer ear and the middle ear.