

WJEC (Wales) Biology A-level

Topic 3.8 - The Nervous System

Definitions and Concepts

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Acetylcholine - A type of neurotransmitter that is used for communication between neurones.

Action potential - The temporary change in electrical potential across the membrane of an axon in response to the transmission of a nerve impulse.

All-or-nothing - A principle that states that all stimuli above a certain threshold value will generate the same size action potential, regardless of the strength of the stimulus.

Axon - A long fibre that conducts nerve impulses away from the cell body.

Axon terminals - Branched endings of an axon that approach the muscle fibre.

Cell body - The region of the neurone that contains the organelles, notably the nucleus and the rough endoplasmic reticulum.

Central canal - A cerebrospinal fluid-filled space that lies in the centre of grey matter.

Central nervous system (CNS) - The brain and spinal cord.

Cholinesterase - An enzyme responsible for the hydrolysis of acetylcholine in the postsynaptic neurone.

Dendrites - Short, branched extensions of the cell body that receive nerve impulses from other neurones.

Depolarisation: A sudden, temporary change in the membrane potential of a neurone in response to the transmission of a nerve impulse. The inside of the axon is less negative than the outside and the potential difference reaches approximately +40 millivolts (mV).

Dorsal root ganglion - A group of sensory neurone cell bodies in the dorsal root of a spinal nerve.

Effector - An organ, tissue, or cell that produces a response to a stimulus.

Grey matter - The darker tissue of the central nervous system which lies centrally and consists of relay and motor neurone cell bodies.

Hyperpolarisation - A decrease in the membrane potential of an axon (due to the opening of K^+ channels), so that it is even more negative than the resting potential.

Meninges - Three membranes that cover the brain and spinal cord: the pia mater, arachnoid mater, and dura mater.

Motor neurone - A neurone that carries nerve impulses from the CNS to the effectors via the ventral root.

Myelin sheath - An electrically insulating layer consisting of the membranes of Schwann cells. It increases the speed of nerve impulses.



Repolarisation - The re-establishment of the resting potential (-70 mV).

Resting potential - The potential difference across the cell membrane of a neurone at rest which is typically -70 millivolts (mV).

Saltatory propagation - The process by which a nerve impulse is propagated along a myelinated neurone. Depolarisation occurs at the nodes of Ranvier and action potentials jump from node to node, speeding up transmission.

Schwann cells - Cells that form the myelin sheath around nerve cells in the peripheral nervous system.

Sensory neurone - A neurone that carries nerve impulses from the receptors to the CNS via the dorsal root.

Sodium-potassium pump - A carrier protein found in the plasma membrane of an axon. It actively transports three sodium ions (Na^+) out of the axon for every two potassium ions (K^+) that it pumps into the axon.

Stimulus - A change in an organism's internal or external environment that can be detected.

Synapse - The junction between two nerve cells or a nerve cell and an effector.

Synaptic cleft - A small gap between neurones across which a nerve impulse is transmitted via neurotransmitters.

Synaptic end bulbs - The end of an axon that is bulbous shaped and contains synaptic vesicles filled with neurotransmitters.

Synaptic vesicles - Secretory vesicles located in the presynaptic neurone that store neurotransmitters. Upon fusion with the presynaptic membrane, their contents are released into the synaptic cleft.

White matter - The lighter tissue of the central nervous system which surrounds grey matter and consists of myelinated axons.

