

# WJEC (Eduqas) Biology A-level

## Topic 3.5 - The Nervous System

### Definitions and Concepts

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

**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 principle** - A principle that states that all stimuli above a certain threshold value will generate the same size of 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 neuron 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 neuron.

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

**Depolarisation:** A sudden, temporary change in the membrane potential of a neuron 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 neuron 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 neuron 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 neuron** - A neuron 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 neuron at rest which is typically -70 millivolts (mV).

**Saltatory propagation** - The process by which a nerve impulse is propagated along a myelinated neuron. 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 neuron** - A neuron 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 ( $\text{Na}^+$ ) out of the axon for every two potassium ions ( $\text{K}^+$ ) 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 neurons across which a nerve impulse is transmitted via neurotransmitters.

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

**Synaptic vesicles** - Secretory vesicles located in the presynaptic neuron 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.

