

Definitions and Concepts for Edexcel (A) Biology A-level

Topic 8 - Grey Matter

Topic 8 - Investigating Brain Function

Sensory neurone: A type of neurone that transmits impulses from receptors to relay neurones in the CNS.

Relay neurones: A type of neurone that exists in the CNS and connects sensory neurones with motor neurones.

Motor neurones: A type of neurone that transmits impulses from the CNS to effectors.

Dendron: An extension from a nerve cell that carries impulses towards the cell body.

Axon: An extension from a nerve cell that carries impulses away from the cell body.

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

Myelination: The formation of a myelin sheath around nerve cells by Schwann cells.

Stimulus: A change in internal or external conditions which brings about a response.

Receptor: A structure which acts as a transducer by detecting changes in the environment and converting them into electrochemical impulses.

Effector: A muscle or gland which produces a response to a stimulus.


Pupil: The hole in the centre of the iris which can contract and dilate using the iris to alter the amount of light which contacts the retina.

Iris: The pigmented muscular ring that surrounds the pupil and controls its diameter.

Retina: The structure at the back of the eye which is composed of photoreceptors and is specialised to detect light.

Saltatory conduction: The setting up of localised circuits between nodes of Ranvier which allows for the rapid propagation of an action potential.

Nodes of Ranvier: Unmyelinated sections of nerve cells which allow for the propagation of an action potential due to their many ion channels.


M E G A
L E C T U R E

Depolarisation: The rapid influx of sodium ions into the cell which cause it to lose its negative charge and the membrane potential to increase.

Hyperpolarization: The drop in membrane potential below the resting potential after repolarization due to open potassium ion channels.

Resting potential: The potential difference across the cell membrane of a neurone at rest which is typically between -60 and -70 millivolts (mV).

Acetylcholine: A neurotransmitter used in the parasympathetic nervous system.

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

Neurotransmitter: A chemical which diffuses across the synaptic gap to stimulate other neurones or effector cells.

All-or-nothing principle: The principle that describes how any generator potential which reaches or exceeds the threshold potential will produce an action potential of equal magnitude.

Rods: A type of photoreceptor found in the retina which is specialised to work in dim light.

Rhodopsin: A protein found in rod cells that converts dim light into an electrochemical impulse.

Opsin: A GPCR that forms part of rhodopsin along with retinal and is involved in converting detected photons into electrochemical signals

Retinal: A protein that makes up rhodopsin along with opsin and forms the light sensitive part of the complex.

Phytochrome: Light sensitive pigments found in plants used to detect changes to external light conditions.

Indoleacetic acid (IAA): A type of auxin mainly produced at growing plant tips which is used to promote cell growth and elongation.

Left cerebral hemisphere: The left side of the brain which controls the right side of the body and is involved in linear reasoning tasks related to language.

Right cerebral hemisphere: The right side of the brain which controls the left side of the body and is involved in holistic reasoning tasks related to language.

Hypothalamus: The region of the brain located near the pituitary gland that is involved in homeostatic control including thermoregulation.


M E G A
L E C T U R E

Medulla oblongata: A region of the brainstem which controls involuntary actions such as heart rate and breathing.

Cerebellum: A region of the brain that controls voluntary movement and coordination.

Magnetic resonance imaging (MRI): A medical imaging technique that uses radio waves and a magnetic field to produce images of internal body structures.

Functional magnetic resonance imaging (fMRI): A medical imaging technique that uses radio waves and a magnetic field to assess brain function through the visualisation of blood flow in brain capillaries.

Positron emission tomography (PET): A medical imaging technique used to assess organ and tissue metabolic function through the use of radioactive molecules and computer analysis.

Computed tomography (CT) scan: A type of medical imaging technique that uses several x-rays and computer software to create detailed images of structures and organs inside the body.

The critical period: A period during visual cortex development where exposure to many different visual stimuli is very important for the full development of neuronal connections.

Habituation: The effect seen where animals gradually stop responding to a stimulus after they have been exposed to it repeatedly.

Moral issues: Issues that conflict with an individual's sense of right and wrong.

Ethical issues: Issues that conflict with the general moral views of society.

Dopamine: A neurotransmitter involved in signalling pathways associated with the brain's reward system.

Parkinson's disease: A neurodegenerative disease which affects the dopamine secreting neurones and leads to a decrease in motor functions and tremors in resting muscles.

Serotonin: A neurotransmitter involved in signalling pathways associated with happiness and mood regulation.

L-DOPA: The precursor molecule to the neurotransmitter dopamine which can be given as a treatment for Parkinson's disease as it is able to cross the blood-brain barrier.

Twin studies: Experimental studies focused on monozygotic twins which are used to compare the influence of environmental and genetic factors on the expression of a phenotype.

Cross cultural studies: Studies that compare different cultures and are used to compare the behaviours of individuals due to different cultural or societal influences.

MDMA: An illegal drug that enhances the release of the neurotransmitters dopamine, noradrenaline and serotonin and can produce symptoms like increased energy and hallucinations when taken.

Genetically modified organism (GMO): An organism which has had its genetic makeup altered through artificial means.

Personalised medicine: The provision of medical treatments that are specifically designed on a patient by patient basis.

Human genome project (HGP): A collaborative research project by many different institutions to sequence the entire human genome which was finished in 2003.

Hormone: A chemical messenger which is carried in an organism's transport systems and binds to a specific receptor.

Topic 8 - Nervous transmission

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Topic 8 - Responses to stimuli

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