

Neural signalling Neuron	Neural signalling Axon vs dendrites
Neural signalling Sodium-potassium pump	Neural signalling Three reasons the resting potential is negative
Neural signalling Nerve impulse	Neural signalling Why is a nerve impulse electrical?
Neural signalling HL only Threshold potential	Neural signalling HL only Ion movements in depolarization and repolarization

Axon: one long single fibre. Dendrites: multiple shorter fibres. Both project from the cell body.

A cell within the nervous system that carries electrical impulses.

More positive ions pumped out than in; K^+ leaks out faster than Na^+ leaks in; negatively charged proteins stay inside.

Uses ATP to pump 3 Na^+ out and 2 K^+ in, establishing and maintaining concentration gradients.

It involves movement of positively charged ions (Na^+ and K^+) across the membrane.

An action potential propagated along a nerve fibre.

Depolarization: Na^+ channels open, Na^+ in.
Repolarization: K^+ channels open, K^+ out.

About -55 mV: the membrane potential that must be reached for voltage-gated sodium channels to open.

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Local currents

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Axes of an oscilloscope trace of an action potential

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Two factors that increase impulse speed

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Coefficient of determination (R^2)

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Saltatory conduction

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Synapse

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Role of calcium ions at a synapse

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Excitatory postsynaptic potential

Membrane potential (mV) on the y-axis
against time (ms) on the x-axis.

Diffusion of Na^+ along the inside and outside
of the axon that brings the next region to
threshold.

r squared: the proportion of variation in the
dependent variable explained by variation
in the independent variable.

Larger axon diameter and myelination.

A junction between neurons or between a
neuron and an effector cell.

Propagation of an action potential from
node to node of Ranvier in myelinated
fibres, giving faster impulses.

Depolarization of the postsynaptic
membrane when a neurotransmitter such
as acetylcholine binds receptors and
positive ions enter.

Enter the presynaptic neuron on
depolarization and act as a signal for
vesicles to release neurotransmitter by
exocytosis.

Neural signalling

Where is acetylcholine used as a neurotransmitter?

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How do neonicotinoids affect insect synapses?

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Inhibitory postsynaptic potential

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Summation

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How do free nerve endings detect pain?

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Consciousness as an emergent property

Bind to acetylcholine receptors and are not broken down, blocking synaptic transmission.

At many types of synapse, including neuromuscular junctions, where it triggers contraction of muscle fibres.

Adding the effects of excitatory and inhibitory inputs; an action potential occurs only if threshold is reached (all-or-nothing).

Hyperpolarization of the postsynaptic membrane by an inhibitory neurotransmitter, making an action potential less likely.

A property that emerges from the interaction of individual neurons in the brain, not present in any single neuron.

Channels for positive ions open in response to heat, acid or capsaicin; ions enter, threshold is reached, impulses go to the brain.