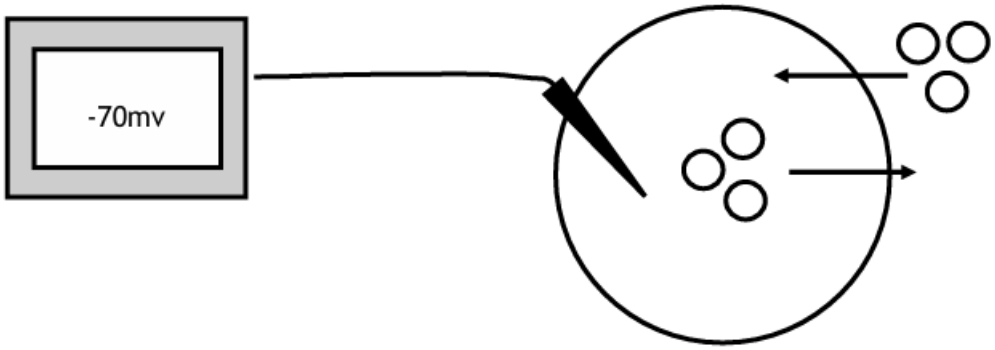
Nerve Impulse Transmission

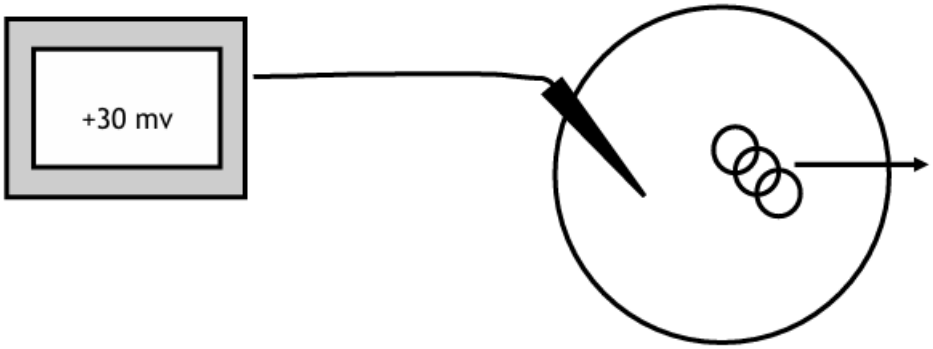
Resting membrane potential

A state where there is **no net flow** of ions across the neuron's plasma membrane.



Nerve Impulse Transmission

Change in the membrane potential of the neuron's plasma membrane.

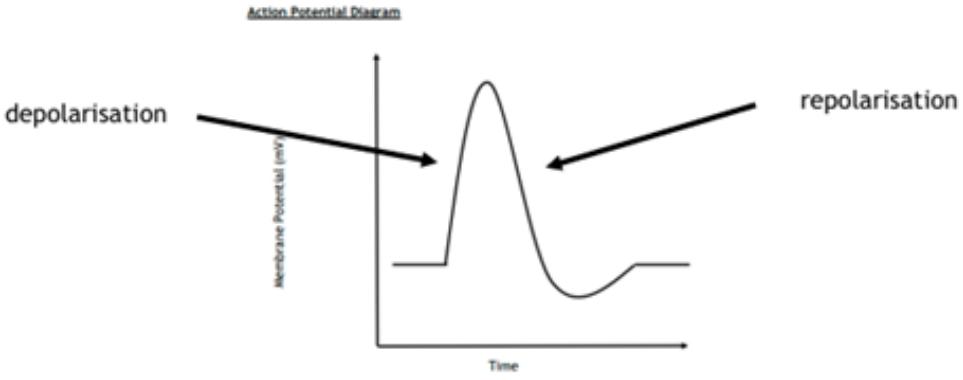


Depolarisation

Change in the membrane potential to a **more positive** value inside the neurone.

Repolarisaton

Change in the membrane potential to a **more negative** value inside the neurone .



Nerve Transmission

Action potential

Wave of electrical excitation along a neuron's plasma membrane.

Pre/Post Synaptic Neurone

When the action potential reaches the end of the neurone, **vesicles** containing **neurotransmitters** fuse with the **pre-synaptic** membrane.

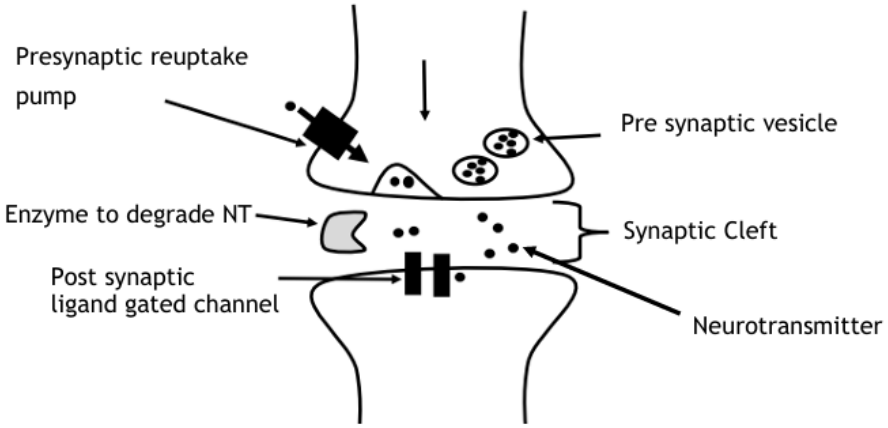
This releases neurotransmitter into the **synapse**.

The neurotransmitter will then bind to its receptor at the post synaptic neurone which is a **ligand gated** channel.

Breakdown of neurotransmitter

To **prevent continual stimulation** of the neurone it is important to break down the neurotransmitter by

1. **Enzyme degradation** in synapse e.g. acetylcholinesterase
2. **Reuptake** into **pre synaptic** neurone via a pump/vesicle



Nerve Transmission Summary

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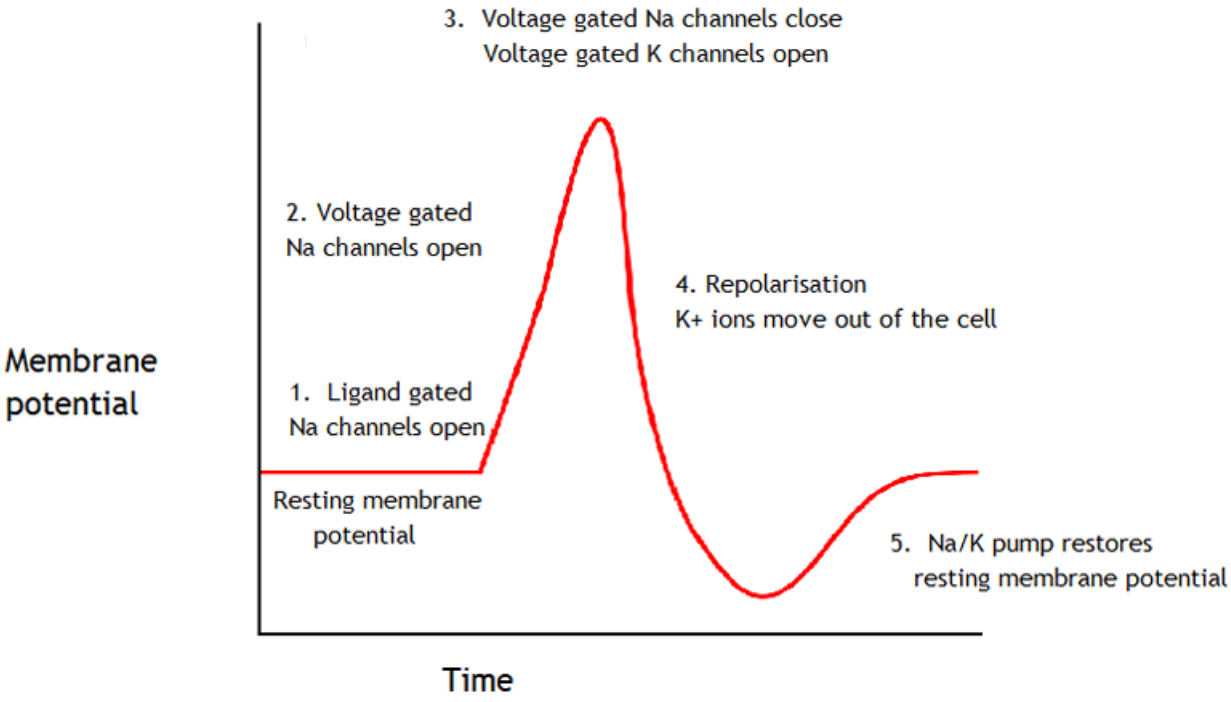
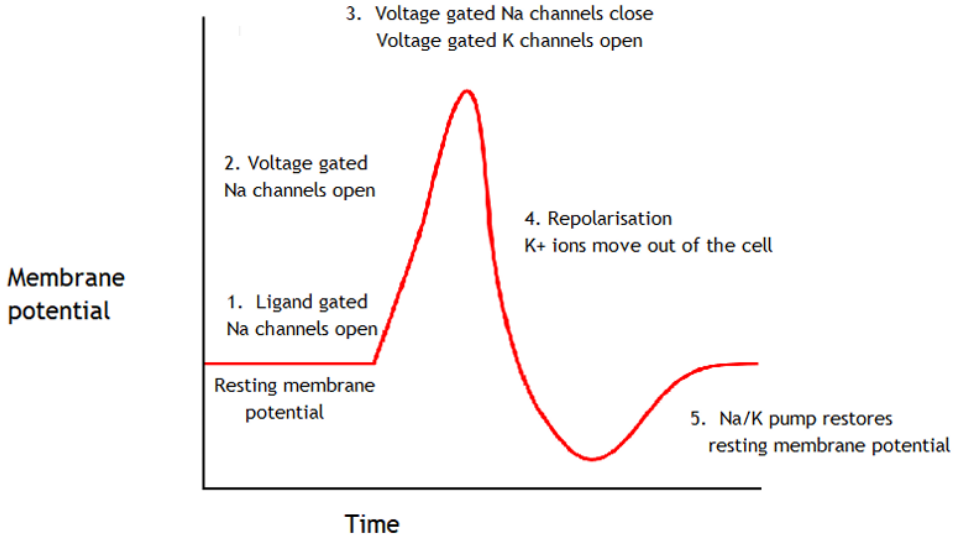


Nerve Transmission



1. Neurotransmitters bind to their receptors (**ligand gated** ion channels) at the post synaptic membrane resulting in **entry of Na^+** ions (depolarisation of the plasma membrane).

2. If **sufficient Na^+ ion movement** occurs, the membrane is depolarised beyond a threshold value (-55mv).

3. This triggers the opening of **voltage gated Na channels** causing much more Na^+ ions to enter the cell down their electrochemical gradient rsulting in a large rapid depolarisation of the membrane potential.

4. Na^+ channels close and **voltage gated K^+ ions open (**+30mv), causing **K^+ ions** to **leave** the cell , restoring the resting membrane potential (repolarisation).

5. This allows inactive voltage gated $Na^=$ channels to return to a conformation that allows them to open again in response to a further depolarisation.

6. Following repolarisation, K^+ and Na^+ ion concentration gradients are restored to the resting membrane potential due to the **Na-K pump**.