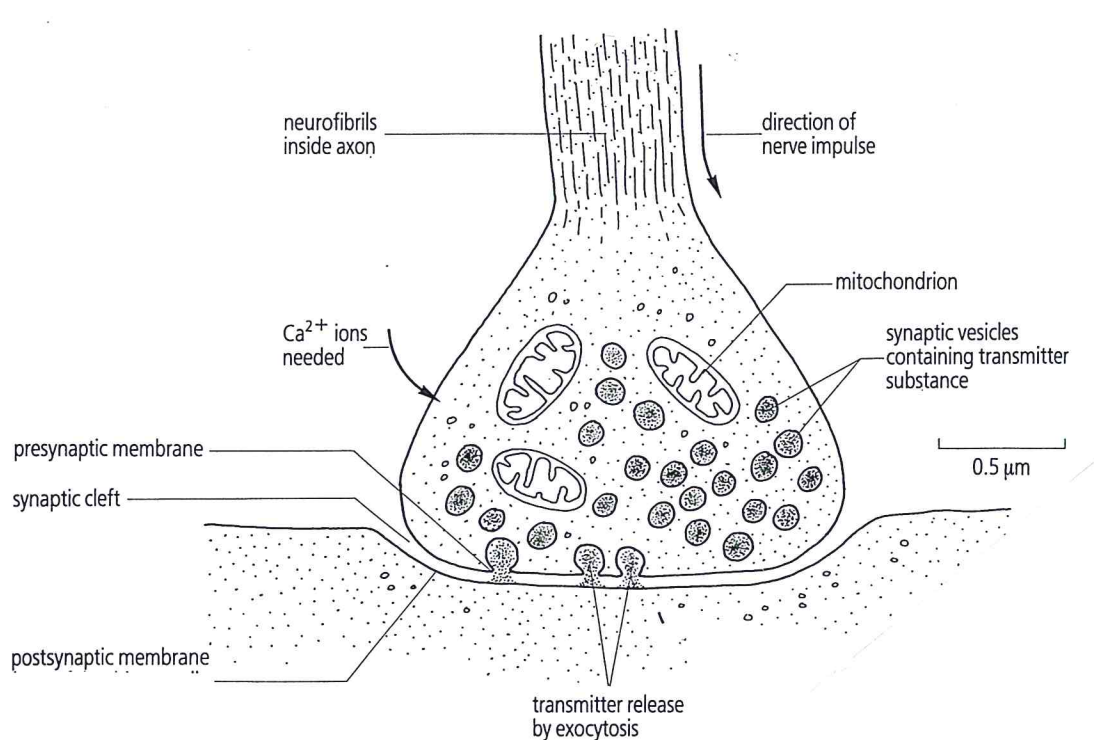


Transmission across a synapse

Synapses pass nerve impulses in one direction only – only the presynaptic neuron has neurotransmitter vesicles.



1. A nerve impulse reaches the **pre-synaptic membrane** and depolarizes it.
2. **Calcium ion channels** in the pre-synaptic membrane open and calcium ions (Ca^{2+}) flow in from the synaptic cleft.
3. **Neurotransmitter vesicles** move to the pre-synaptic membrane, fuse with it and release neurotransmitter, e.g. **ACh** (acetylcholine).
4. The neurotransmitter diffuses across the synaptic cleft and binds with a **receptor protein** in the **post-synaptic membrane**.
5. Sodium ion channels open, sodium ions (Na^+) rush in and depolarize the post-synaptic membrane until the depolarization reaches the **threshold level** and generates an action potential in the post-synaptic neuron.
6. **Cholinesterase** enzyme breaks down the ACh in the synaptic cleft to stop continuous transmission; the products are reabsorbed into the pre-synaptic neuron and resynthesised in the vesicles.
7. Calcium ions are pumped out of the pre-synaptic neuron into the synaptic cleft.