

The Nervous System Part 4

- **Neurone to neuron** transmission is connected by **synapses**
 - They can also transfer information from **neurone to effector cell**
- The neurones preceding and succeeding the synapse have special names:
 - **Presynaptic neurone**
 - Conducts the impulse to the synapse
 - **Postsynaptic neurone**
 - Transmits electrical signal away from synapse
 - Can be neurone, muscle cell or gland cell in PNS
- There are two types of synapse:
 - **Chemical synapse**
 - This is the **most common** type of the two
 - These **synapses are specialised for the release and reception of chemical neurotransmitters**
 - They are composed of two parts:
 - **Axon terminal**
 - This is on the presynaptic neurones membrane
 - These contain **synaptic vesicles** filled with neurotransmitter
 - **Receptor region**
 - This on the postsynaptic neurones membrane
 - This area **receives the neurotransmitter**
 - The synaptic cleft prevents impulses being spread directly to the next neurone
 - It also ensures that the neurone path is unidirectional
 - The process of chemical synaptic transfer:
 - The **action potential arrives at the terminal**
 - **Voltage gated Ca^{2+} channels open and Ca^{2+} enters the terminal**
 - Ca^{2+} causes **synaptic vesicles to release neurotransmitter** and be exocytosed
 - The **neurotransmitter diffuses across the synaptic cleft and binds to receptors** on the postsynaptic neurone
 - **The binding of neurotransmitter causes ion channels to open and create graded potentials**
 - The **neurotransmitter is the retaken by the presynaptic neurone** via membrane proteins or enzyme degradation
 - **Electrical synapse**
 - These are **less common than a chemical synapse**
 - The **neurones are electrically coupled**
 - They are **joined by gap junctions** that connect the cytoplasm of the two neurones
 - **Communication is very fast** and **can be unilateral or bilateral**
 - These are **found in some regions of the brain that are responsible for eye movement** and in the **hippocampus in areas involving memory and emotion**
 - These are **most abundant in embryonic nervous tissue**
- Depending on the **amount of neurotransmitter released**, and the **amount of time it stays in the cleft**, the **graded potentials can be of different strengths**
 - Depending on the effect of the postsynaptic neurone, postsynaptic potentials can be:
 - **EPSP: excitatory postsynaptic potentials**
 - **IPSP: Inhibitory postsynaptic potential**