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