**Hand-out 4**

**Cells of the Nervous System**

|  |  |  |
| --- | --- | --- |
| **Name of cell** |  |  |
| **Function** | Receive and transmit electrical impulses from one part of the body to another | Support and maintain the neurons |

There are 3 **types** of **neuron**:

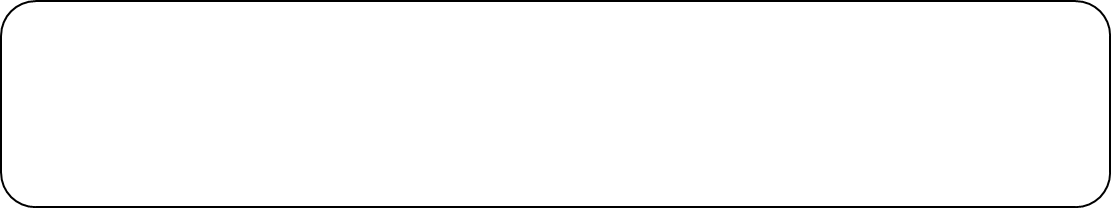
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**Structure of neurons**

The 3 types of neurone share the same **basic structures**:

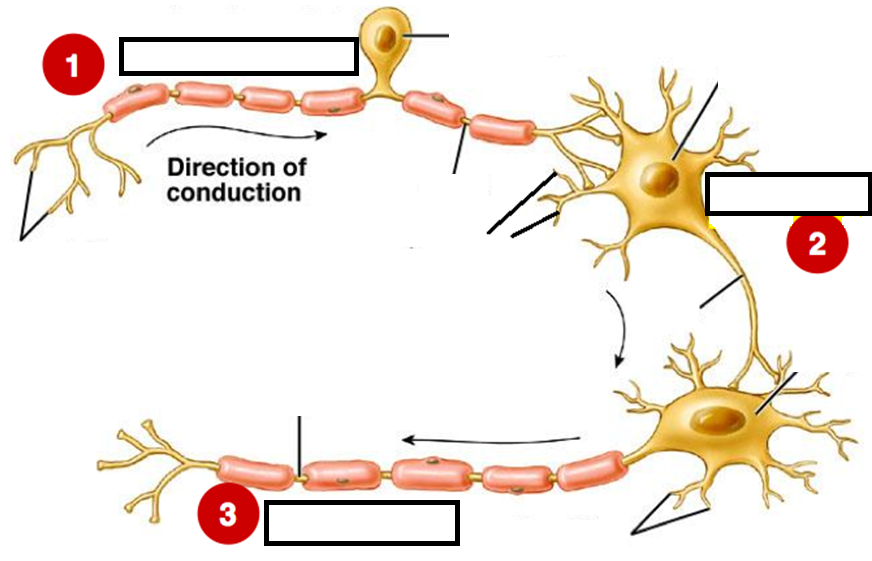
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The **direction** in which a nerve impulse travels is always:



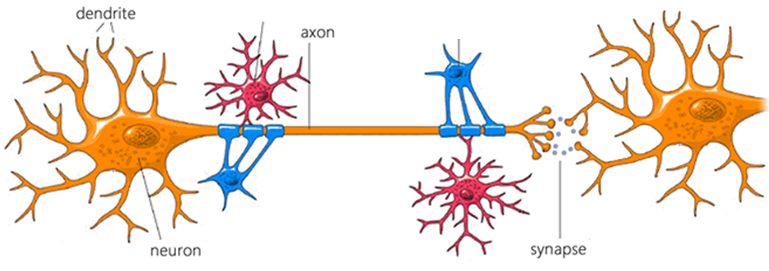
**Dendrites**

A single nerve fibre which carries impulses **A**way from a cell body onto the next neurone in the sequence or to the effector. The axon ends at a junction called the **synapse**.

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**Glial Cells**

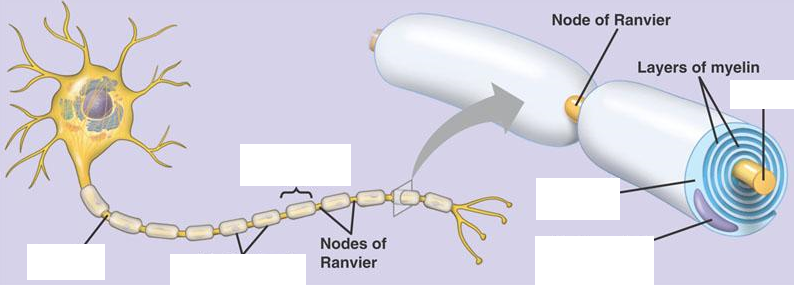
* There are several types of glial cells which have numerous functions.
* They **do not** transmit nerve impulses but are essential to provide neurons with….



neuron is supported physically and chemically by glial cells

**Myelination**

* The \_\_\_\_\_\_\_\_\_\_ of nerve fibres are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by a **layer of fatty material** called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The **myelin sheath** is formed from special \_\_\_\_\_\_\_\_\_\_ cells which wind their membrane around the axon many times.
* Describe the important **function played by the myelin sheath**:



Myelination and development

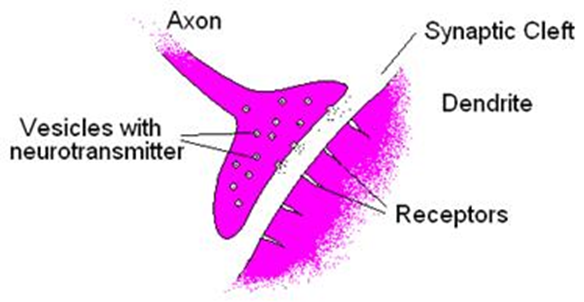
* Myelination is **not complete at birth** but continues from birth into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* As a result responses to stimuli in the first two years of life are not as \_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as those of an older child or adult.

Myelination and disease

* Certain diseases damage or destroy the myelin sheath causing a loss of co-ordination.
* These include: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If time is available investigate one of the above conditions.

**Synaptic Cleft**



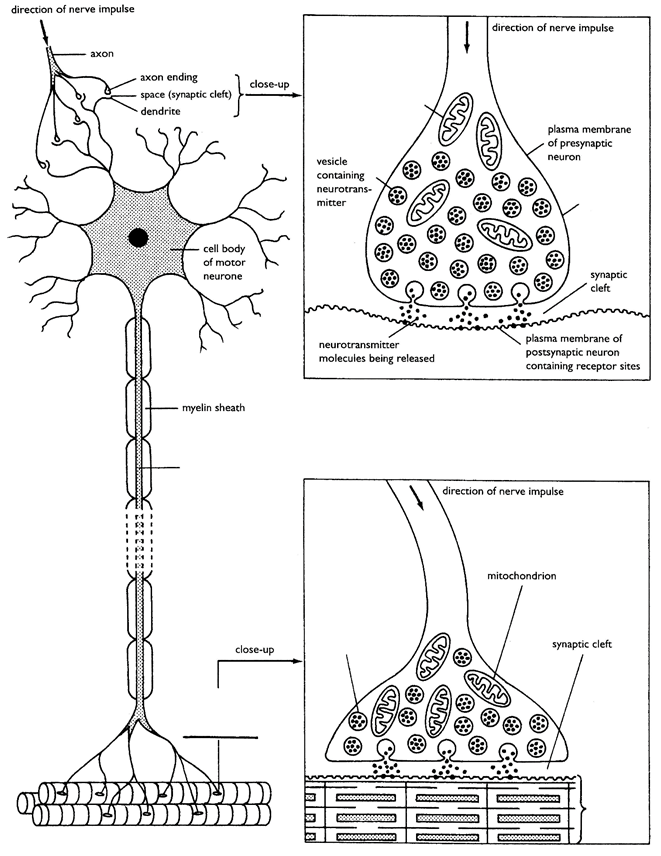
* Neurons are separated from each other by **tiny microscopic gaps**.
* The junction where two neurons meet (axon on one cell and dendrite of the next) is called the ­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The synapse allows the transmission of nerve impulses between \_\_\_\_\_\_\_\_\_\_\_\_.
* The narrow space which separates the plasma membranes of the two neurones is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_.
* Neurons connect with other \_\_\_\_\_\_\_\_\_\_ at the synaptic cleft.

**Neurotransmitters**

* The nerve cell before the synapse is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ neuron.
* The one after the synapse is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ neuron.
* Neurons also connect with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells via spaces similar to synaptic clefts.
* For a nerve impulse to cross the synaptic cleft, chemicals called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ have to enter the synapse.

e.g. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Neurotransmitters relay messages within and out with the \_\_\_\_\_\_\_\_\_\_\_\_ from \_\_\_\_\_\_\_\_\_\_ to neuron.
* Neurotransmitters are stored in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



**Chemical Trasnsmission at the Synapse**

Nerve endings of postsynaptic neuron

Neurotransmitter diffuses across synaptic cleft

Arrival of impulse causes vesicles to fuse with presynaptic membrane

Direction of a nerve impulse

**Summing up: Chemical transmission at a synapse**