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# UNDERSTANDING THE NERVOUS SYSTEM AND PAIN

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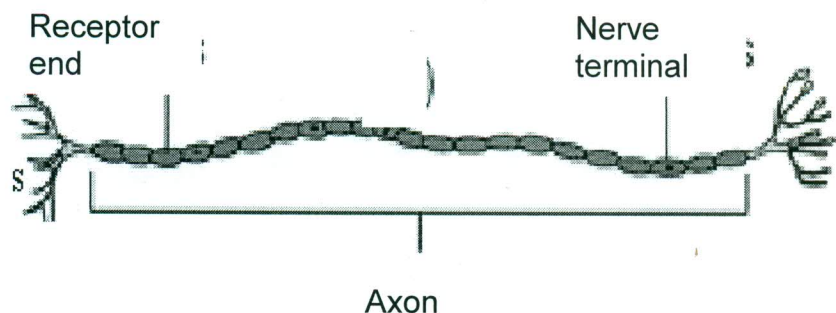
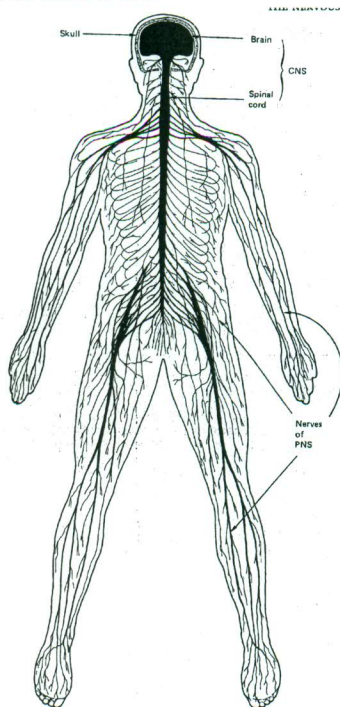
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Before we look at how we feel pain, let's look at how our nervous system normally works.

## Peripheral Nerves and Receptors in the Tissues

Our body is made up of millions of nerves - most of which are too small to be seen on a scan. Those in our body, arms and legs are called peripheral nerves, and form what is known as the peripheral nervous system. The nerves have special receptors which detect changes in the tissues. Messages from different tissues are carried by the nerves to the spinal cord and then up to the brain. This keeps our brain constantly informed about what is going on in and around our body. Thus nerves are like electrical wires, carrying information to and from the brain. The main nerves (such as the sciatic nerve) are formed from bundles of many tiny nerves.

Each nerve has the same three parts – a receptor (the nerve ending), a long nerve fibre (the axon), and a nerve terminal, as shown in the picture below. The point at which two nerves join together is called a synapse. When something excites the receptor at one end, a message is sent as an electrical current along the axon, and when it reaches the terminal, causes the releases of chemicals, called neurotransmitters. The neurotransmitters latch onto receptors at the end of the next nerve, rather like a docking station, and the message is relayed along the next nerve towards the brain. All nerves work like this.



Different things will make these receptors get excited. For example, there are receptors that detect changes in touch, pressure, stretch, and chemicals. In our eye our receptors detect changes to light; in our ear they detect changes to vibration. These receptors are quite specific in what they respond to. Therefore when light shines in your ear, you do not hear anything.

Peripheral nerves are rather like a record player with a needle picking up the information, which is then carried in electrical impulses to the amplifier where it is decoded. The electrical activity in the wire itself means nothing until it is decoded by the amplifier and turned into sound. Likewise, the information carried by a nerve is simply electrical information and is not decoded until it reaches the brain. The sensation of pain is not 'pain' as we know it until it is interpreted by the brain.

