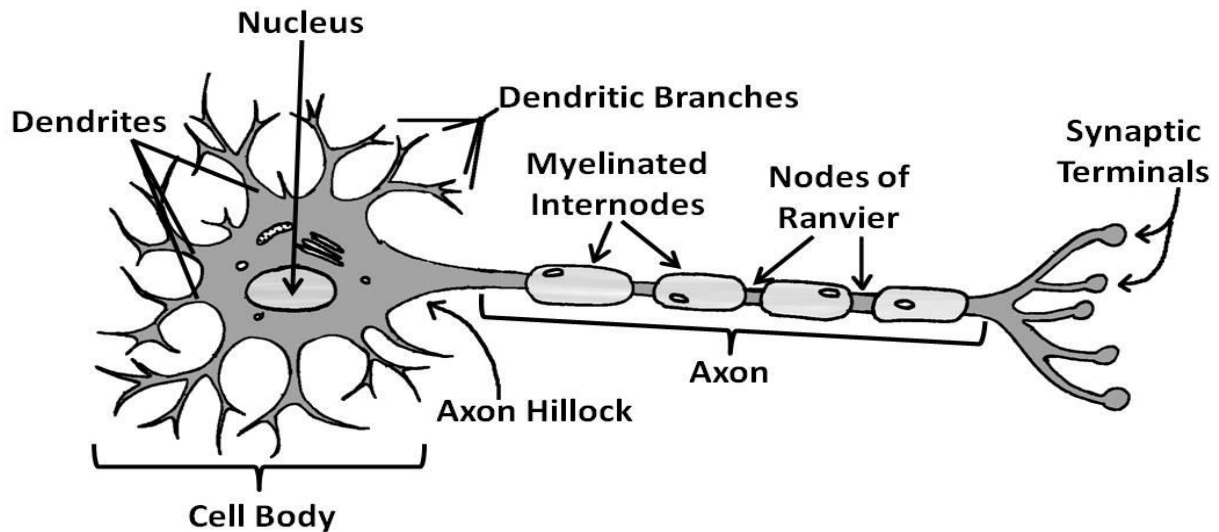


Nerve Cell Anatomy



A **nerve** is a group of neurons bundled together like a cable. Nerve cells, or **neurons**, carry information throughout the nervous system. All neurons have certain parts in common:

- The **cell body** contains the nucleus and most of the organelles, and may be located at one end of the nerve cell or in the middle. Cell bodies tend to be grouped near each other or clustered together. These groups of clustered nerve cell bodies are called **ganglia**, and are usually only found in the **peripheral nervous system (PNS)** (i.e. outside the brain and spinal cord), rather than the **central nervous system (CNS)**.
- **Dendrites** are short branches of the cells spreading out from the cell body. Dendrites receive signals from other neurons or sensory cells and carry them towards the cell body.
- The **axon** is a single long extension of the cell (much longer than the dendrites), which allows a neuron to transmit information over long distances. Axons usually end with a cluster of **synaptic terminals**. Some axons in the human body are up to a meter long! The axon may be covered in a layer called the myelin sheath.
- The **myelin sheath** is made of two different types of supporting cells. In the PNS, myelin is made up of Schwann cells, while in the CNS, myelin is made of oligodendrocytes. These supporting cells are wrapped many times around the axon, and are called **myelinated internodes**. The cells are arranged with small spaces between them, called the **nodes of Ranvier**.

TYPES OF NEURONS

In the human body, there are three main types of neurons. They are categorized based on the directions in which information is transmitted:

SENSORY NEURONS (a.k.a. afferent neurons) receive information from the environment (via the PNS) and relay it to the CNS. They usually have a single long axon connecting to sensory organs. They may or may not have a myelin sheath on their axons. Their cell body is usually located on the part of the cell nearest the CNS.

The **CNS** consists of the brain and the spinal cord. Signals from nerves around the body are received and processed in the CNS and body actions are controlled from here.

MOTOR NEURONS (a.k.a. efferent neurons) transmit commands from the CNS to muscles and glands in the body (the PNS). They usually have one long axon that is branched at the transmitting end. Like sensory neurons, their cell body is located close to the CNS and they usually have myelin on the axon.

INTERNEURONS connect sensory and motor neurons, and are mostly found in the CNS (although some interneurons are found in peripheral ganglia). They have highly branched dendrites, but a shorter axon than the sensory or motor neurons. Many other neurons may connect to a single interneuron.

Questions:

1. What are dendrites?
2. Which type of nerve (sensory/motor/interneuron) would you expect to find the most of in the brain? Near the surface of the skin?
3. True or false: All neurons have their cell body in the CNS.
4. In what part of a neuron would most protein synthesis occur?
5. What is the main difference between the CNS and the PNS?
6. What cells make myelin?

Answers:

1. Dendrites are the branched extensions of a neuron that receive signals from other cells.
2. Brain: interneurons. Skin: sensory neurons.
3. False. Many nerves have their cell bodies in ganglia, outside the brain and spinal cord.
4. Most protein synthesis would occur in the cell body, where most of the organelles are found.
5. The CNS comprises the spinal cord and the brain while the PNS contains neurons not located in the CNS.
6. Myelin is made up of oligodendrocytes in the CNS and Schwann cells in the PNS.

