

Difference Between Myelinated and Unmyelinated Axons

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Key Difference - Myelinated vs Unmyelinated Axons

Nervous system is in charge of receiving and distributing sensory signals everywhere in the body. Neurons are the building blocks or the basic cells of the nervous system. Neurons are responsible for transmitting the right information or command to correct location of the body. A neuron has three main components: cell body, dendrites, and an axon. Dendrites receive electrical signal and handover to the axon. Axon transmits the signal to the next neuron. Axons are insulated with an electrical insulator layer called myelin sheath. Myelin sheath is composed of a fatty material called myelin. Myelin sheath is produced by special peripheral nervous system cells called Schwann cells. Myelin is produced by Schwann cells, and myelin sheath is formed around the axon in a spiral fashion. Myelin sheath increases the speed of the signal transmission, but not all axons are myelinated. Based on the presence and absence of the myelin sheath around the axon, there are two types of neurons. They are myelinated neurons and unmyelinated neurons. Myelinated neurons possess myelinated axons, and unmyelinated neurons possess unmyelinated axons. The key difference between myelinated axon and unmyelinated axon is that **myelinated axons have a myelin sheath while unmyelinated axons do not have a myelin sheath.**

What are Myelinated Axons?

An axon is a long thin projection of the nerve cell (neuron). It conducts electrical impulses away from the neuron cell body to the chemical synapse. Axons are also known as nerve fibers. Nerve impulses are transmitted along the axons continually without changing its path. Cells of the peripheral nervous system support the transmission of the nerve impulses via neurons.

Schwann cells are one type of special glial cells that form myelin sheaths around the axons. Myelin sheath is an electrical insulating layer composed of myelin protein and lipids, including cholesterol, glycolipids, and phospholipids. Neurons whose axons are covered with myelin sheaths are known as myelinated neurons.

Axons that are protected with myelin sheaths are known as myelinated axons. Generally, larger axons are covered with myelin sheaths, and they are termed as myelinated fibers or medullated fibers. Thicker axons possess a thicker coat of myelin and longer internodes. When axons are myelinated, they look glistering white.

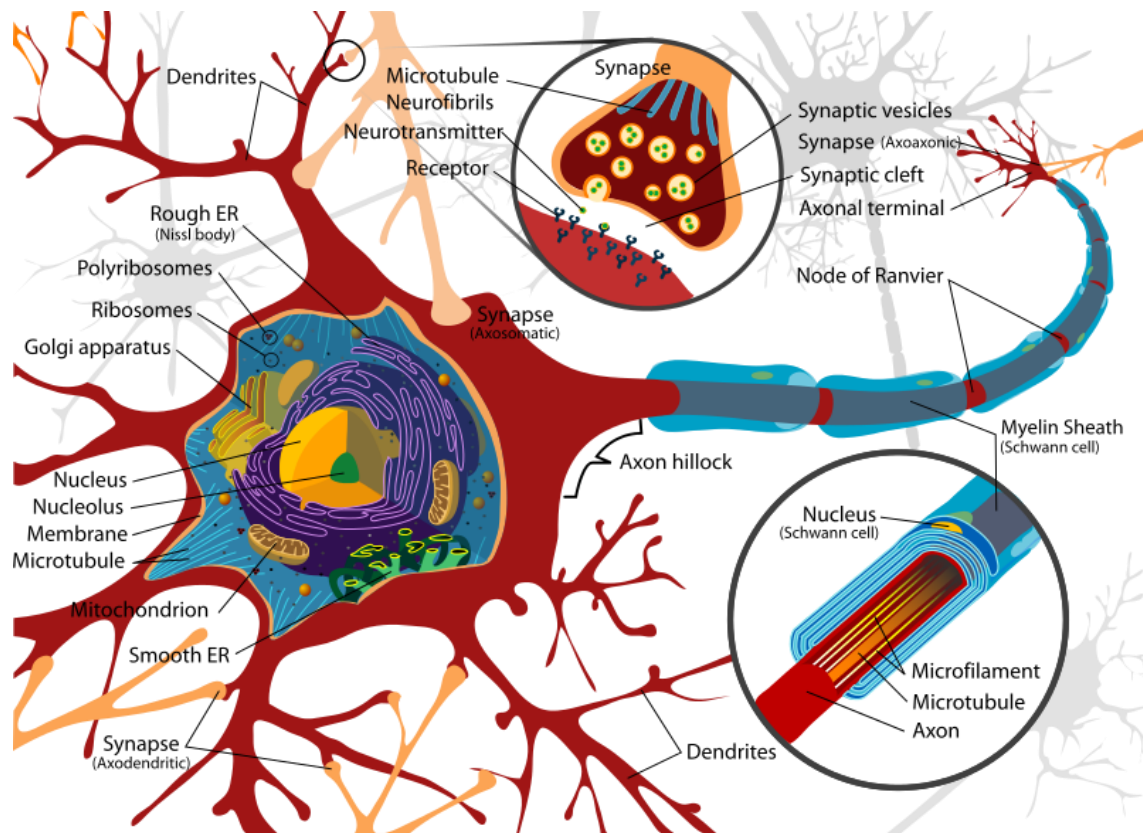


Figure 01: Myelinated axon

Myelin sheath is derived from Schwann cells and Schwann cells keep gaps when wrapping around the axon. Those gaps are unmyelinated. Hence, the myelin sheath is interrupted by these gaps and they are named as nodes of Ranvier. When axons are myelinated, the conduction of nerve pulses is faster along the neurons and it avoids the loss of impulse during the conduction.

What are Unmyelinated Axons?

When axons are not protected with myelin sheaths, they are known as unmyelinated axons. Normally, thinner axons, which are less than one micron in diameter, do not have myelin sheaths around them. These axons or nerve fibers are also known as non myelinated or non-medullated fibers. Conduction of nerve

impulse through unmyelinated axon is slower than in myelinated axons. There is also a chance of losing the impulse during the conduction.

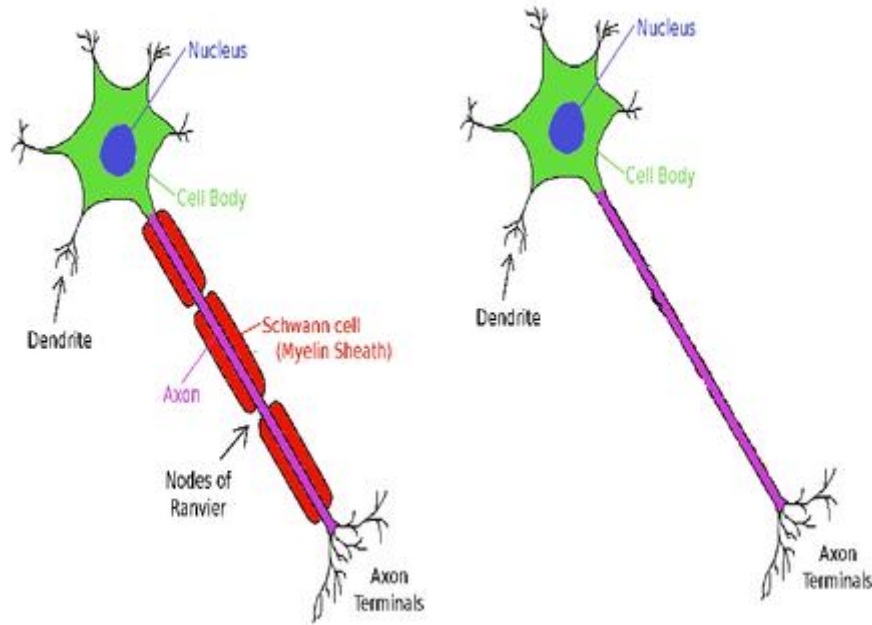


Figure 02: Unmyelinated Axon and Myelinated Axon

What is the difference between Myelinated and Unmyelinated Axons?

Myelinated vs Unmyelinated Axons	
Myelinated axons are the neuron axons which are covered with myelin sheaths.	Unmyelinated axons are the axons which are not covered with myelin sheaths.
Speed of Nerve Impulses	
The conduction of nerve impulses is faster in myelinated axons.	The conduction of nerve impulse is slower in unmyelinated axons.
Loss of Impulses	
Loss of impulses is avoided in myelinated axons.	There is more chance of losing impulses.
Thickness	

Myelinated axons are thicker than unmyelinated axons.

Unmyelinated axons are thinner than myelinated axons.

Summary – Myelinated vs Unmyelinated Axons

Axon is a threadlike extension of a neuron. It extends from the soma of the neuron. Axons transmit electrical signals away from the neuron. In some neurons, axons are wrapped with special glial cells called Schwann cells. Schwann cells form an electrical insulating layer around the axon, which is known as myelin sheath and it increases the speed of the signal transmission. Some axons do not have myelin sheaths. They are known as unmyelinated axons. The axons which are covered with myelin sheath are known as myelinated axons. This is the difference between myelinated and unmyelinated axons.

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