

Difference Between Muscle Cells and Nerve Cells

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Key Difference - Muscle Cells vs Nerve Cells

Living systems consist of different types of cells. A cell is the structural and functional unit of living organisms. They involve in different functions of the body. Muscle and the nervous system are important aspects in the context of living organisms. The muscle tissue is made up of muscle cells. The nervous system is composed of different nerve cells. Therefore the **structural unit of muscle tissue is the muscle cell, and the structural unit of the nervous system is the nerve cell or neuron**. This is the **key difference** between muscle cells and nerve cells.

What are Muscle Cells?

Muscle tissue is considered as one of the main tissue types present in the body. It involves different functions such as attachment to the skeletal system that provides movement, heat generation and organ protection. The muscle tissue is made up of muscle cells. The muscle cell is the structural unit of muscle tissue. The cytoplasm of the muscle cell is known as the sarcoplasm, and the plasma membrane is known as the sarcolemma. Muscle tissue is composed of different subdivisions according to the location, type of cells and the function. These divisions include skeletal muscle, cardiac muscle and smooth muscle etc. Each type of muscle contains unique, structural unit cells with specialized properties.

Out of the different muscles, skeletal muscle is the most abundant and common muscle type that is present in the body. The skeletal muscles make up 40 % of the total body mass. The skeletal muscles are voluntary, which means they can be directly controlled by the cerebral cortex. The structural unit of skeletal muscle tissue is the skeletal muscle cell. It is developed through the fusion of many different smaller cells during embryonic development. This results in the formation of long multinucleated muscle fibers. Under microscopic observations, the skeletal muscle cells could be visualized with a pattern of stripes. Due to this characteristic, the skeletal muscle fibers are referred to as striated.

Cardiac muscle is only present in the heart. It is made up of cardiac muscle cells. The cardiac muscle is controlled involuntarily. When comparing the cells of cardiac muscle and skeletal muscle, the cardiac muscle cells are much shorter. The functioning of the cardiac muscle is regulated by specialized cells in the cardiac muscles known as pacemaker cells. Cardiac muscle cells do not fuse together during embryonic development. Therefore, these cells are uni-nucleated. The cells contain a higher number of mitochondria for the provision of high energy.

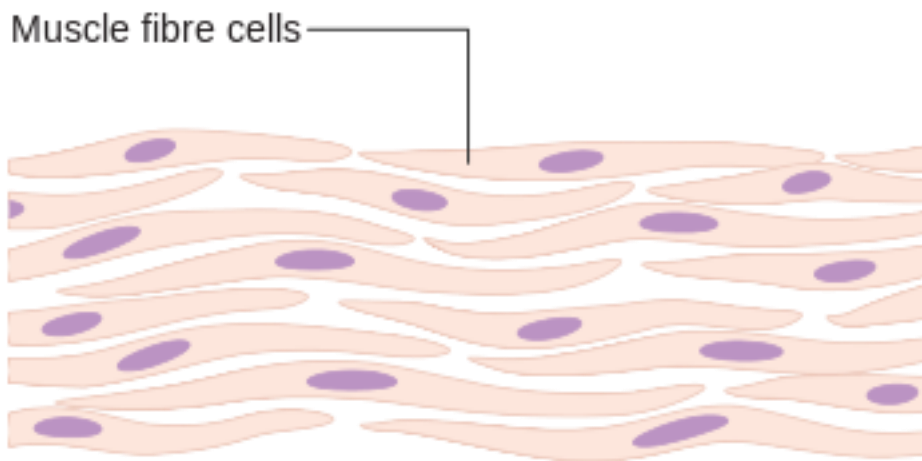


Figure 01: Muscle Cells

Smooth muscle is typically located in regions such as organs, blood vessels, bronchioles of the respiratory tract. The smooth muscle cells make the smooth muscle tissue. They are long and thin cells with a single nucleus present at the center of the cell. The cells are not striated and not branched. Therefore they exist as uni nucleated non-striated and non branched cells.

What are Nerve Cells?

In the context of nerve cells, they are the structural unit of the nervous system. The nervous system is important in responding to different stimuli. Nerve cells control different activities of the body. The nerve cells or neurons involve in the transmission of signals throughout the body in the form of coordination. According to the type of message that is transmitted, nerve cells could be classified into different types. These include sensory nerve cells, motor nerve cells and associated nerve cells. Sensory nerve cells are the type of nerve cells that involve in the transmission of nerve impulses generated by different stimuli to the central nervous system.

Motor nerve cells transmit information that is generated from the central nervous system directly to the organ to cause a change in the functioning of the organs. Associated or intermediate nerve cells involve in the communication between sensory and motor nerve cells. Therefore, the associated nerve cells are connected to sensory nerve cells and motor nerve cells.



Figure 02: Nerve Cells

Nerve cells provide a platform for responding towards a particular stimulus and involves in the transmission of stimuli to the central nervous system, different organs or to different nerve cells as well. The shape and size of nerve cells differ. All neurons consist of a set of similar cell parts even though they differ in size. These include cell body, dendrites, axon, presynaptic terminal.

What are the Similarities Between Muscle Cells and Nerve Cells?

- Both cell types are involved in the coordination of the body.
- Both cell types are really important elements of our body.

What is the Difference Between Muscle Cells and Nerve Cells?

Muscle Cells vs Nerve Cells	
Muscle cells are the structural units of the muscular tissue.	Nerve cells are the structural units of the nervous system.
Cytoplasm	
Cytoplasm of the muscle cell is known as sarcoplasm.	Cytoplasm of the nerve cell is known as neoplasm.
Plasma Membrane	
The plasma membrane of the muscle cell is known as sarcolemma.	The plasma membrane of the nerve cell is known as neurilemma.

Summary - Muscle Cells vs Nerve Cells

Muscle tissue is considered as one of the main tissue types present in the body. It is composed of basic structural units known as muscle cells. The cytoplasm of the muscle cell is known as the sarcoplasm, and the plasma membrane is known as the sarcolemma. Nerve cells are the structural unit of the nervous system. The nerve cells or neurons involve in the transmission of signals throughout the body in the form of coordination. There are three main types of nerve cells; sensory nerve cells, motor nerve cells and associated nerve cells. This is the difference between muscle cells and nerve cells.

Reference:

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