



## Department of Anesthesia Techniques {Biology}

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### What is a cell

Cells can be thought of as tiny packages that contain minute factories, warehouses, transport systems, and power plants. They function on their own, creating their own energy and self-replicating — **the cell is the smallest unit of life that can replicate**. The cell was discovered by Robert Hooke in (1665).

### The Cell Theory

The cell theory states that all biological organisms are composed of cells; cells are the unit of life and all life come from preexisting life. The cell theory is so established today that it forms one of the unifying principles of biology.

The generally accepted portions of the modern Cell Theory are as follows:

1. The cell is the fundamental unit of structure and function in living things.
2. All organisms are made up of one or more cells.
3. Cells arise from other cells through cellular division.

The expanded version of the cell theory can also include:

- Cells carry genetic material passed to daughter cells during cellular division
- All cells are essentially the same in chemical composition
- Energy flow (metabolism and biochemistry) occurs within cells.

### Prokaryote

any organism that lacks a distinct nucleus and other organelles due to the absence of internal membranes. Bacteria are among the best-known prokaryotic organisms. The lack of internal membranes in prokaryotes distinguishes them from eukaryotes.

### Eukaryote

any cell or organism that possesses a clearly defined nucleus. The eukaryotic cell has a nuclear membrane that surrounds the nucleus, in which the well-defined chromosomes (bodies containing the hereditary material) are located. Eukaryotic cells also contain organelles, including mitochondria (cellular energy exchangers), a Golgi apparatus (secretory device), an endoplasmic reticulum (a canal-like system of membranes within the cell), and lysosomes (digestive apparatus within many cell types)



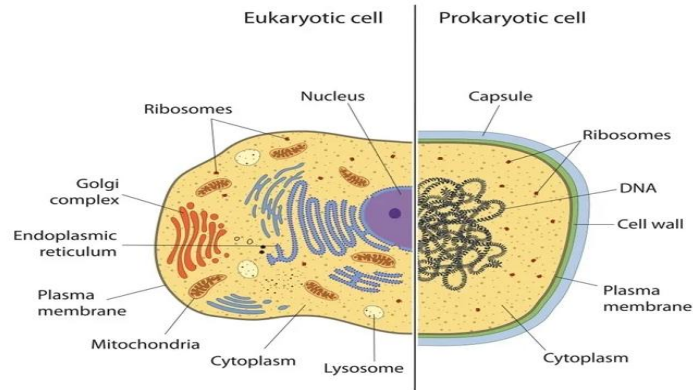
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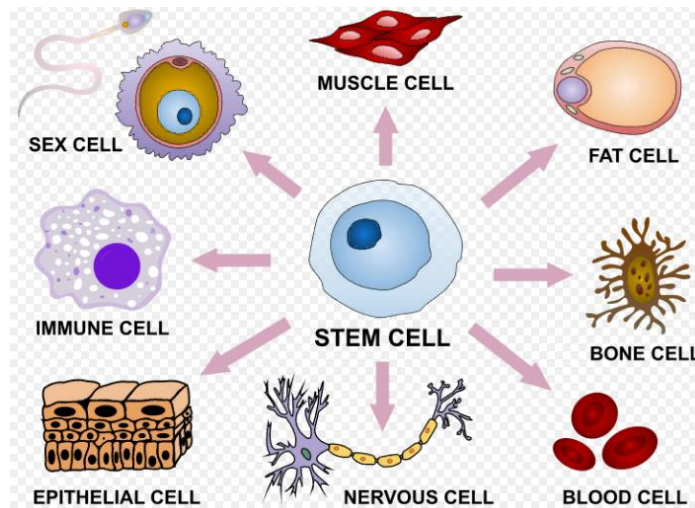


### Types of cells

When you consider the complexity of the human body, it is no surprise that there are hundreds of different types of cell. Below is a small selection of human cell types:

### Stem cells

Stem cells are cells that are yet to choose what they are going to become. Some differentiate to become a certain cell type, and others divide to produce more stem cells. They are found in both the embryo and some adult tissues, such as bone marrow.





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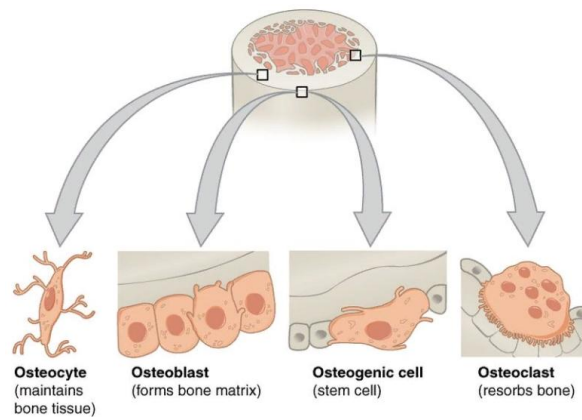
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## Bone cells

There are at least three primary types of bone cell:

- Osteoclasts.
- Osteoblasts.
- Osteocytes.

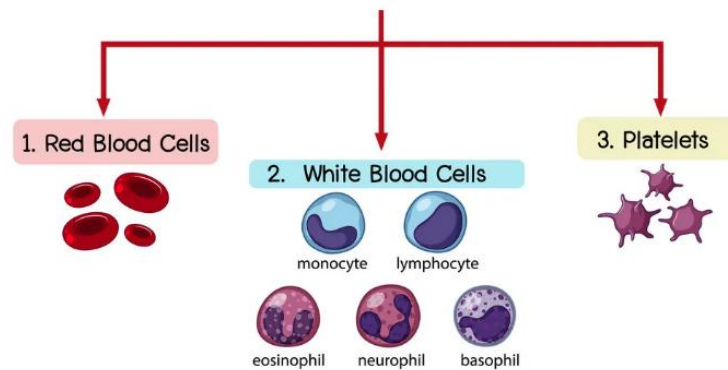


## Blood cells

There are three major types of blood cell:

- red blood cells.
- white blood cells.
- platelets.

## TYPES OF BLOOD CELLS





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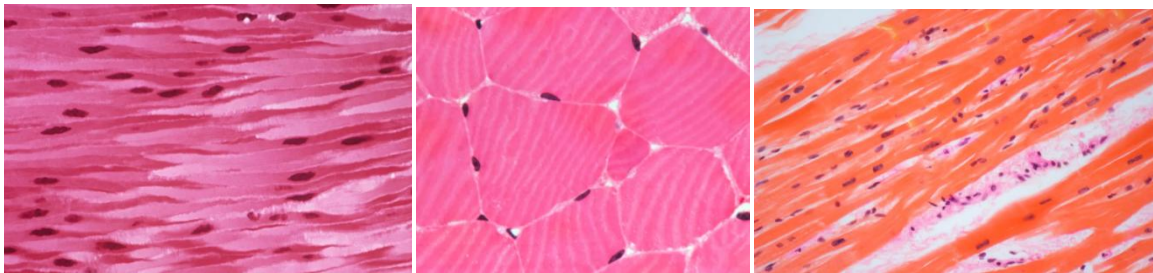
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### Muscle cells

Also called myocytes, muscle cells are long, tubular cells. Muscle cells are important for a huge range of functions, including movement, support, and internal functions, such as peristalsis — the movement of food along the gut.



Heart(cardiac)

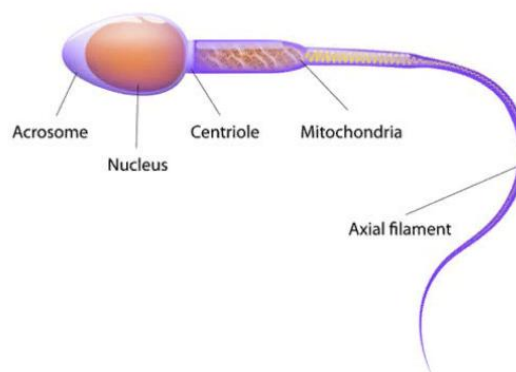
Skeletal

Smooth

### Sperm cells

These tadpole-shaped cells are the smallest in the human body. They are motile, meaning that they can move. They achieve this movement by using their tail (flagellum), which is packed with energy-giving mitochondria.

### SPERM CELL





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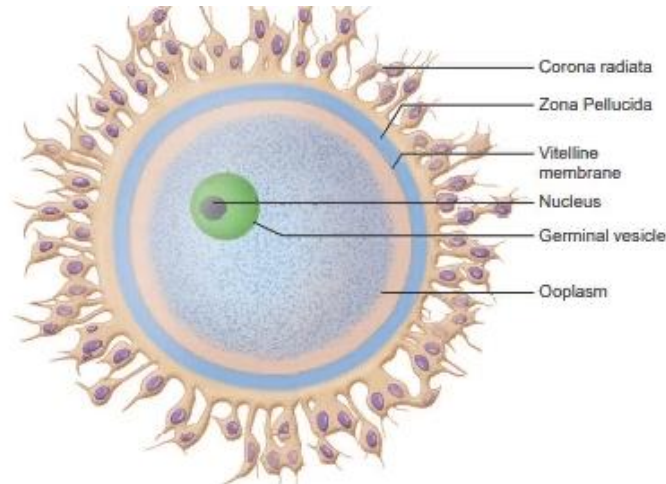
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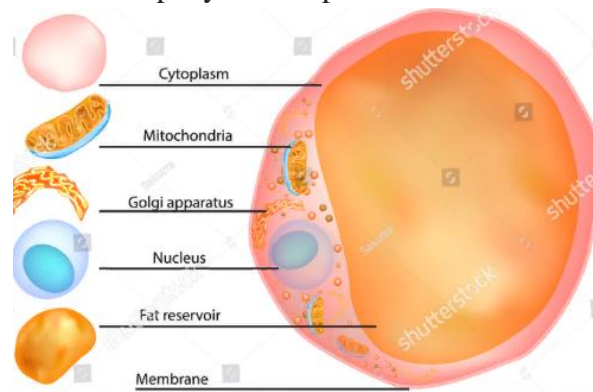
### Female egg cell

Compared with the sperm cell, the female egg cell is a giant; it is the largest human cell. The egg cell is also haploid so that the DNA from the sperm and egg can combine to create a diploid cell.



### Fat cells

Fat cells are also called adipocytes and are the main constituent in adipose tissue. They contain stored fats called triglycerides that can be used as energy when needed. Once the triglycerides are used up, the fat cells shrink. Adipocytes also produce some hormones.





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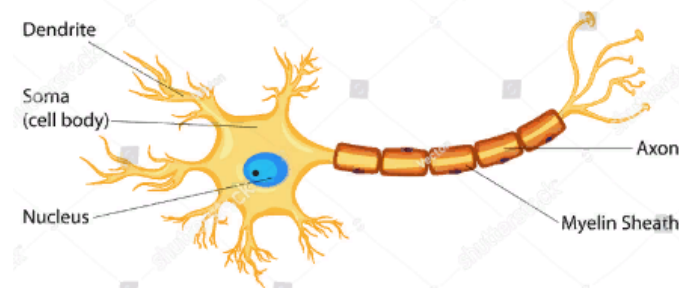
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### Nerve cells

Nerve cells are the communication system of the body. Also called neurons, they consist of two major parts — the cell body and nerve processes.



### Cell Shape

Usually, the cells are round, elongated or spherical. There are also some cells which are long and pointed on both the ends. Such cells exhibit spindle shape. In some cases, the cells are very long. Some may be branched like the neuron or the nerve cell. The nerve cell transfers and receives messages.

### Cell Size

The cell size is variable. In the living organisms, the cell size may be as small as a millionth of a meter or may be as large as a few centimeters. Usually, all the cells are microscopic in size and aren't visible to the naked eye. Thus, they need to be enlarged by a microscope for seeing.