Difference Between Erythrocytes Leukocytes and Thrombocytes

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Key Difference - Erythrocytes Leukocytes vs Thrombocytes

Blood tissue is composed of different types of cells and components. It is an important element of the body since it acts as the main medium of transportation of nutrients, gases, wastes, hormones etc. throughout the body. Blood is one of the main constituents of the circulatory system. All components of blood serve different functions. There are three major types of blood cells namely, erythrocytes (red blood cells), leukocytes (white blood cells) and thrombocytes (platelets). **Erythrocytes involve in the transportation process where it fulfills the oxygen need of all cells, Leukocytes are the main cellular components of the immune system that work towards body defense against invading pathogens while Thrombocytes involve in the blood clotting process which prevents excessive bleeding.** This is the **key difference** between Erythrocytes, Leukocytes and Thrombocytes.

What are Erythrocytes?

Erythrocytes are more commonly known as red blood cells. Erythrocytes provide the unique characteristic colour to blood and are involved in the transportation of gasses, mainly oxygen to various cells, and tissues present all over the body. The erythrocyte is a small blood cell with a biconcave shape. When mature, it doesn't contain a nucleus. The presence of a biconcave shape provides flexibility to the cell which allows the erythrocyte to squeeze through smaller blood vessels. The absence of a nucleus proves extra space for the transportation of oxygen. The erythrocytes possess a special type of protein called haemoglobin which is highly rich with iron molecules containing oxygen binding sites.

The erythrocyte is originated and developed within the bone marrow from hemocytoblast. Hemocytoblasts are multipotent cells that are present in the mesenchyme. Once it undergoes a development period of 5 days, it becomes an erythroblast. Gradually, when the rest of the development stages occur (filling of haemoglobin protein and formation of nucleus and mitochondria), the erythroblast becomes an immature erythrocyte. Upon maturation, the erythrocyte degenerates its nucleus. The lifespan of a normal erythrocyte is 100 - 120 days. Erythrocytes are destroyed in the spleen.

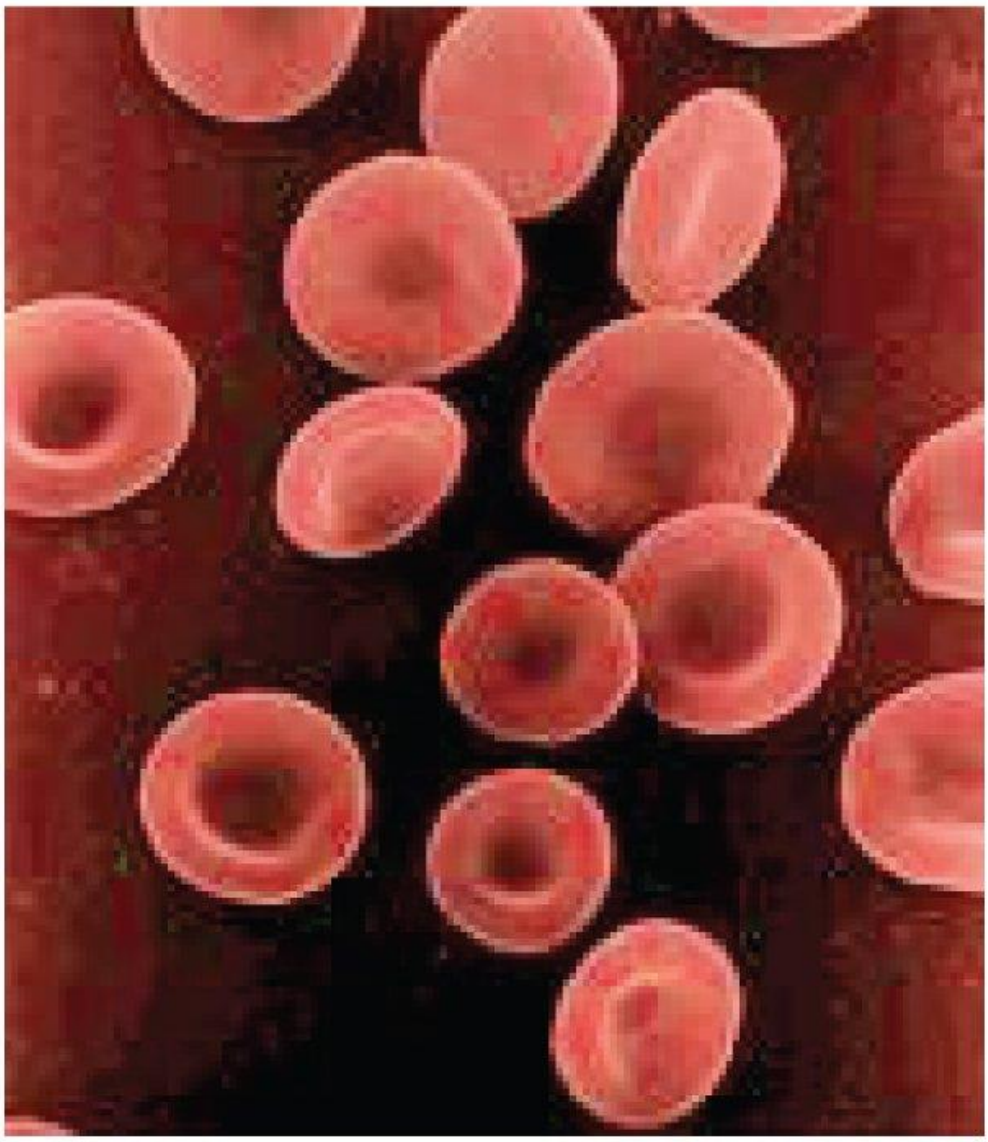

Figure 01: Erythrocytes

Different disease conditions related to erythrocytes are polycythemia (higher erythrocyte count), anaemia (lower erythrocyte count) and sickle cell anaemia (which is a genetic disorder that disrupts the normal shape of the cell into a sickle shape which prevents its normal functioning).

What are Leukocytes?

Leukocytes are known as white blood cells. These are the main cells that are present in the immune system of our body. They involve in protecting the body from invading pathogens that could disrupt the normal functioning of the body. All leukocytes are synthesised in the bone marrow and developed from a special type of multipotent cells which are known as hematopoietic stem cells. They are present in the blood and also in the lymphatic system. The normal leukocyte count in a healthy human is 4500 - 11000 cells per microliter of blood. If this count is exceeded, it is known as leukocytosis which has the potential to be developed into disease conditions called leukaemia. If the leukocyte count is too low, it causes the condition called leucopenia which shows an increased risk of infection.

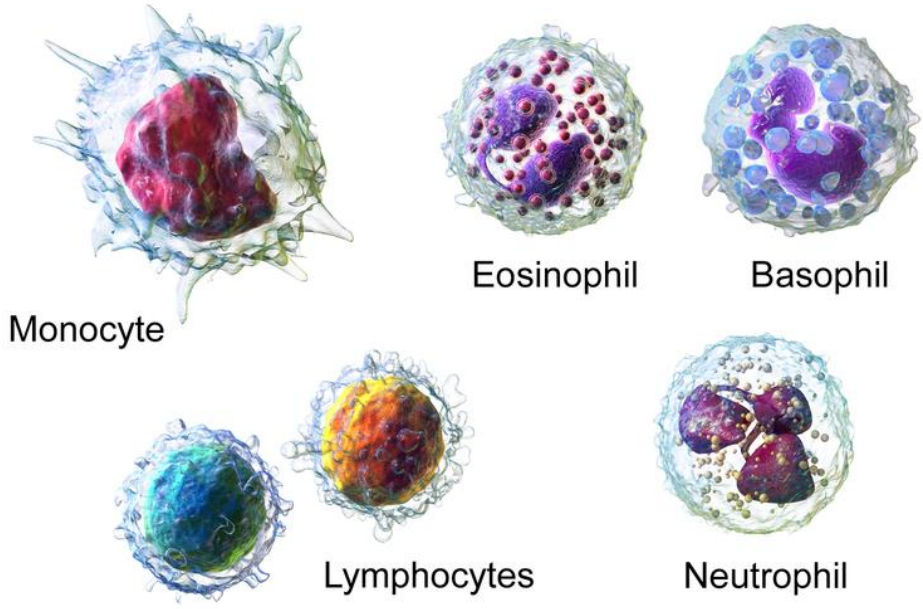

Figure 02: Leukocytes

Leukocytes consist of a nucleus. Leukocytes are two types depending on the presence or absence of granules in the cytoplasm and are referred to as granulocytes and agranulocytes respectively. They are also referred to as polymorphonuclear leukocytes due to the presence of nuclei at varying shapes. This category includes neutrophils, eosinophils and basophils. Granulocytes are referred to as mononuclear leukocytes which consist of a nucleus with one lobe. Monocytes and lymphocytes are belonging to this category of cells. Lymphocytes include B cells, T cells and natural killer cells (NK cells). Monocytes lead to the development of macrophages. All these cells are major cellular components of the immune system.

What are Thrombocytes?

Thrombocytes are commonly referred to as platelets. It is a component present in blood that mainly involves the process of blood clotting (blood coagulation). Platelets are not considered as cells. They are fragments of the cytoplasm and do not contain a nucleus. Platelets are derived from megakaryocytes that are present in the bone marrow. Thrombasthenia is a contractile protein that is most abundantly present in the cytoplasm of platelets. Platelets are unique blood component in mammals. Platelets don't have a particular shape or size. Platelets appear as dark purple once a blood smear is stained. When the balance between synthesis and destruction of platelets are altered, it leads to several disease conditions. Lower in platelet count will result in thrombocytopenia, and higher platelet count causes thrombocythemia.

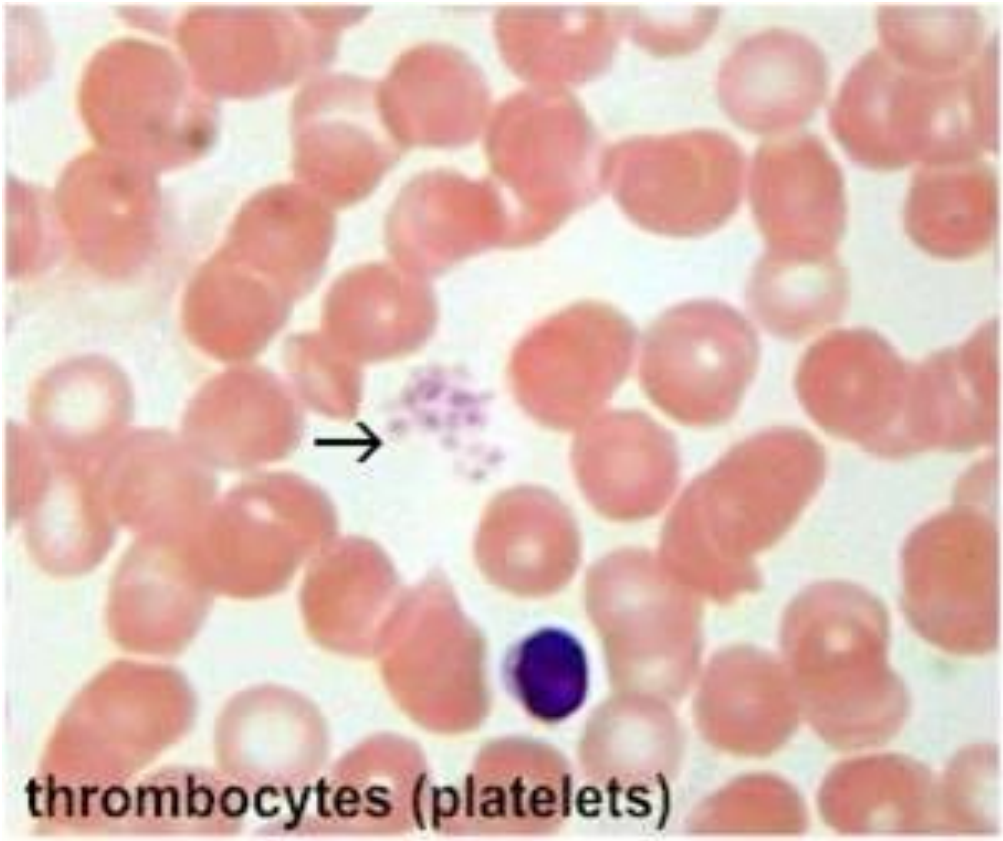

Figure 03: Thrombocytes

The main function of the platelets is to assist in hemostasis; the process of blood coagulation to prevent excessive bleeding due to endothelial ruptures. Once identified, the platelets move to the target location of rupture and carry out a cascade of reactions; adhesion, activation and aggregation. Adhesion is the attachment of platelets around the location of rupture or damaged. During activation, the platelets change their shapes which stimulate receptors to release chemical messengers. Aggregation is the connection that is built up among the platelets through receptor bridges. All these reactions lead to the formation of a blood clot together with a mesh of fibrin protein to prevent bleeding.

What is the Similarity Between Erythrocytes, Leukocytes and Thrombocytes?

- All are components of the blood.

What is the Difference Between Erythrocytes, Leukocytes and Thrombocytes?

Erythrocytes vs Leukocytes vs Thrombocytes	
Erythrocytes	Erythrocytes are more commonly known as red blood cells.
Leukocytes	Leukocytes are known as white blood cells.
Thrombocytes	Thrombocytes are commonly referred to as platelets

Shape	
Erythrocytes	Erythrocytes are biconcave in shape.
Leukocytes	Leukocytes are irregular in shape.
Thrombocytes	Platelets are random fragments.
Count per mm^3	
Erythrocytes	The normal count of erythrocytes is 4-6 million.
Leukocytes	Leukocytes count is between 4000-11000.
Thrombocytes	Platelet count is150,000 – 500,000.
Function	
Erythrocytes	Transportation of oxygen is the main function of erythrocytes.
Leukocytes	Immunity and defence are the functions of leukocytes.
Thrombocytes	Blood clotting is the main function of platelets.
High Conditions	
Erythrocytes	Polycythemia is the condition which causes due to the high count of erythrocytes.
Leukocytes	Leukocytosis is the condition which occurs due to the high count of leukocytes.
Thrombocytes	Thrombocytosis is the condition which occurs due to high levels of thrombocytes.
Low Conditions	
Erythrocytes	Anemia is the condition which causes due to low levels of erythrocytes.
Leukocytes	Leukopenia is the condition which causes due to low levels of leukocytes.
Thrombocytes	Thrombocytopenia is the condition which causes due to low levels of thrombocytes.
Associated Disease Conditions	
Erythrocytes	Sickle cell anaemia is a disease caused due to abnormal erythrocytes.
Leukocytes	Leukemia is one disease caused due to the abnormally increased production of leukocytes.
Thrombocytes	Hemophilia is a disease due to less number of platelets.

Summary - Erythrocytes Leukocytes vs Thrombocytes

Erythrocytes are more commonly known as red blood cells which involve in the transportation of gasses, mainly oxygen to various cells and tissues present in the body. The erythrocyte is a small blood cell with a biconcave shape. It doesn't contain a nucleus when it matures. The erythrocyte is originated and developed within the bone marrow from hemocytoblasts. The lifespan of a normal erythrocyte is 100-120 days. It is destroyed in the spleen**.** Leukocytes are known as white blood cells. These

are considered as the main cells that present in the immune system of the body. The normal leukocyte count in a healthy human is 4000-11000 cells per microliter of blood. Leukocytes consist of a nucleus. Thrombocytes are commonly referred to as platelets. It is a component present in blood that mainly involves the process of blood clotting. Platelets are not considered as cells. They are fragments of the cytoplasm and do not contain a nucleus. This is the difference between erythrocytes, leukocytes and thrombocytes.

Reference:

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