Department of Veterinary Physiology

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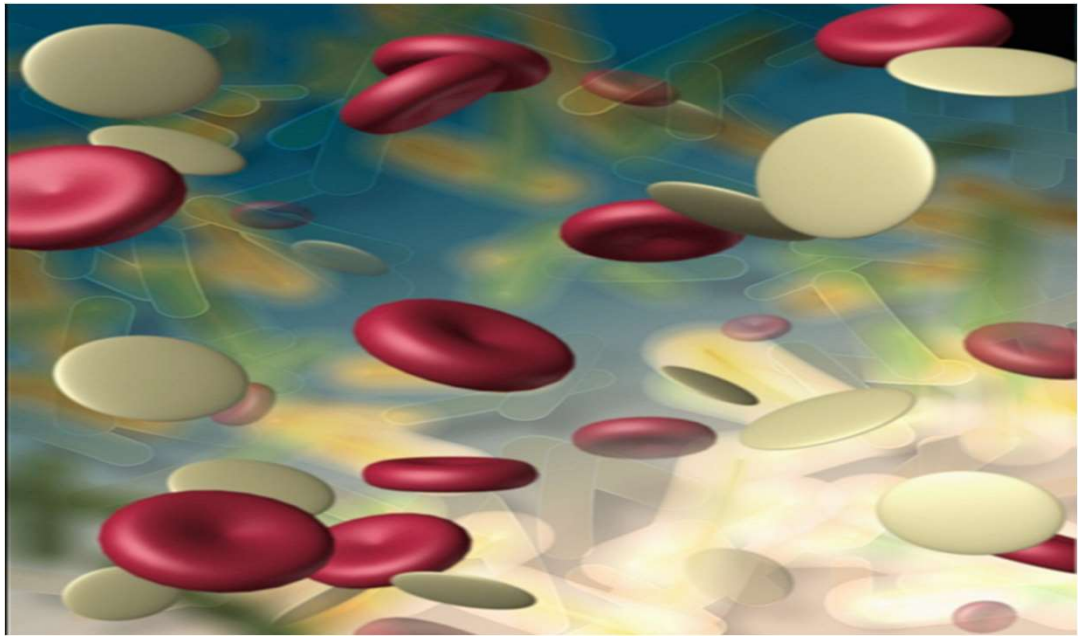
B.V.Sc. & A.H.
1st Year (2023-24)

।पशुधनं नित्यं सर्वलोकोपकारकम्।

Composition of Blood



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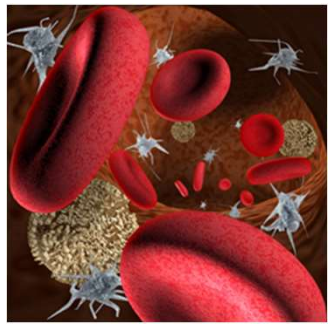
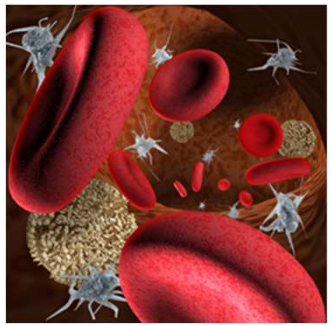
Composition of Blood



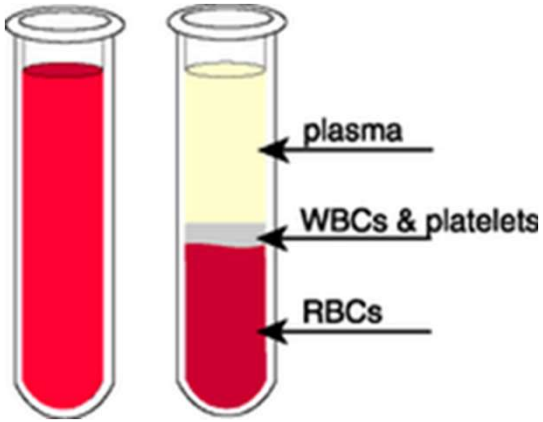
- Blood is responsible for…..
  - Transporting gases (oxygen & carbon dioxide)
  - Transporting waste products
  - Transporting nutrients
  - Helping remove toxins from the body

Blood makes up 6–8% of our total body weight.



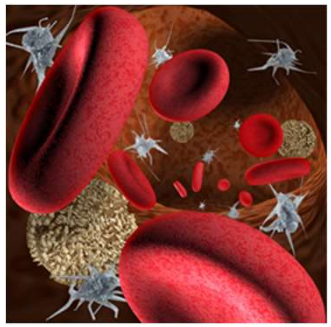
Normal adult blood volume is 5 L.

Blood is made up of cellular material in a fluid called plasma.



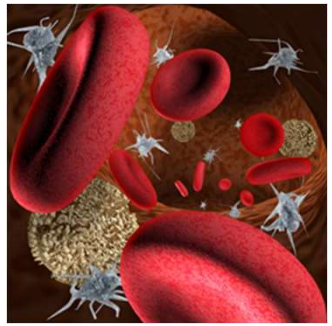
Blood is a circulating tissue consisting of three types of cells.

1. Red Blood Cells → Erythrocytes
2. White Blood Cells → Leukocytes
3. Platelets → Thrombocytes

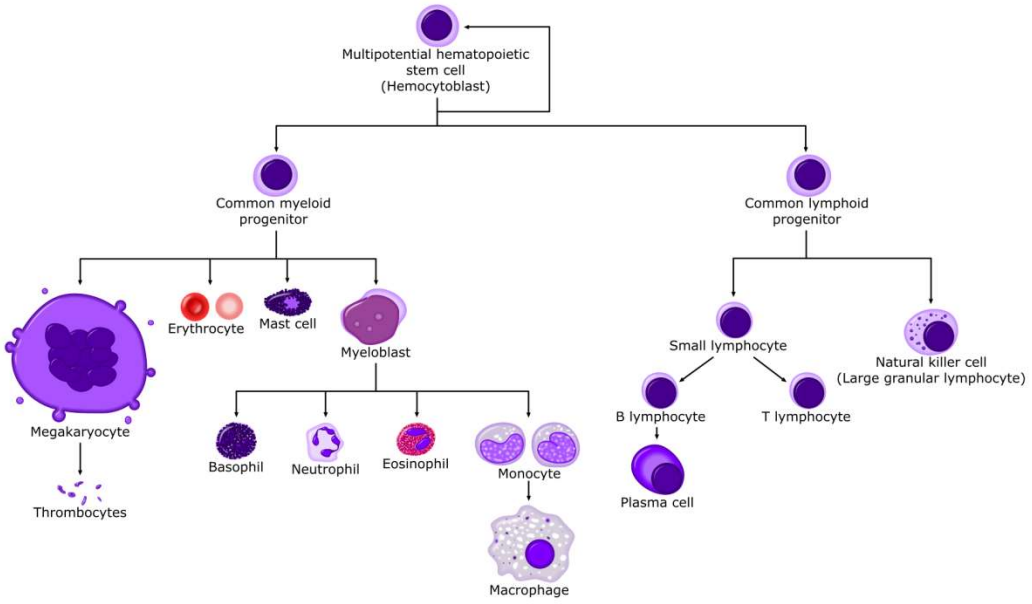


- The cells listed above are suspended in a liquid known as plasma.

Formation of Blood

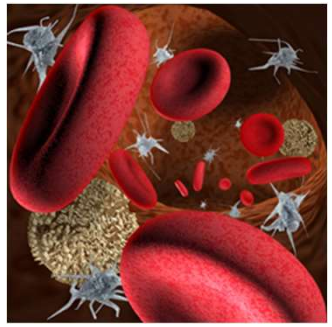


- Hematopoiesis → the formation and development of blood cells
- In adults the cellular elements are produced in the bone marrow.
- Some WBCs are produced in the lymphatic tissue and bone marrow.
- Blood cells need certain nutrients to form properly.
- Examples include…..
  —Iron
  —Folic acid
  —Vitamin B12



- All blood cells formed come from a hematopoietic stem c
- These cells can become any blood cell.

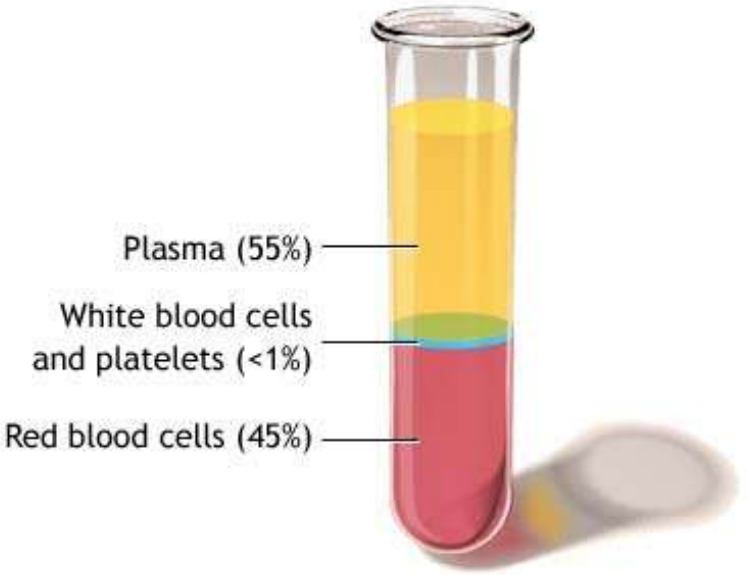
Composition of Blood



The blood is made up of cells that are suspended in liquid called plasma.

Plasma makes up 55% of the blood.

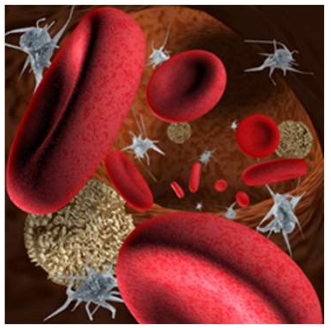
Plasma is made of 90% water and 10% proteins, lipids, carbohydrates, amino acids, antibodies, hormones, electrolytes, waste, salts, and ions



Blood cells make up the remaining 45% of the blood.

Red blood cells make up 99% of the blood cells.

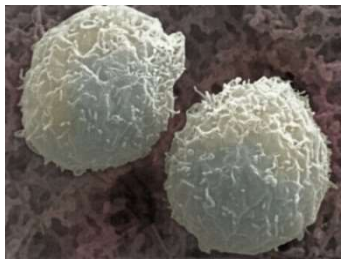
White blood cells and platelets make up the other 1%.



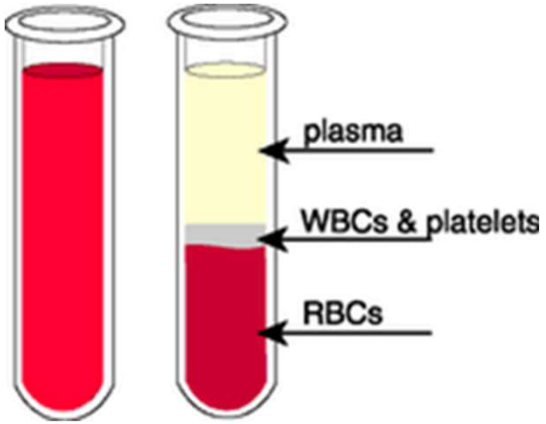
- Each type of blood cell performs a different function.

- Red blood cells (Erythrocytes)

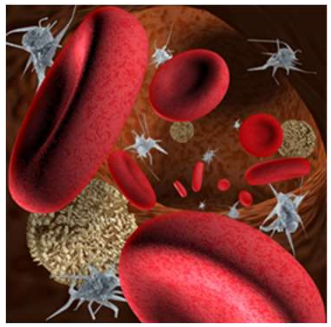
- White blood cells (Leukocytes)



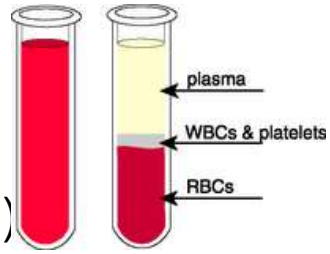
- Platelets (Thrombocytes)

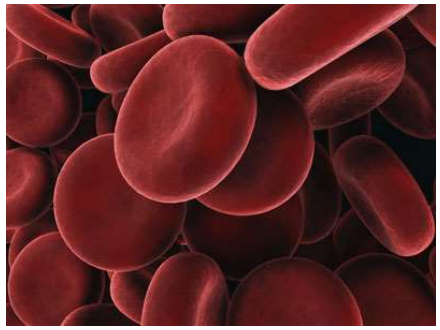


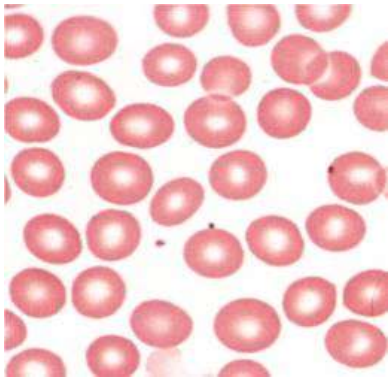
Red Blood Cells



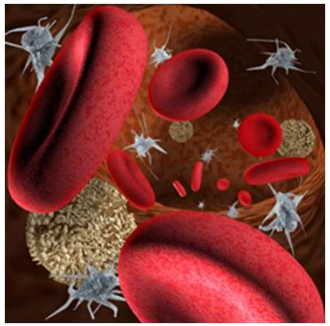
- Erythrocytes or RBCs
  - — Most abundant cell in the blood (4 million – 6 million per microliter of blood)
  - — Formed in the bone marrow
  - — Mature forms do NOT have a nucleus
  - — Shaped as biconcave disks
  - — 6-8 micrometers in diameter
  - —Life span of about 120 days
  - — Hemoglobin (iron protein)is found in the RBC
  - — Hemoglobin carries oxygen from the lungs to the rest of the body and carbon dioxide binds to the RBC and is taken to the lungs to be exhaled.





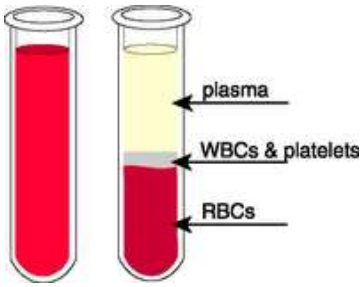


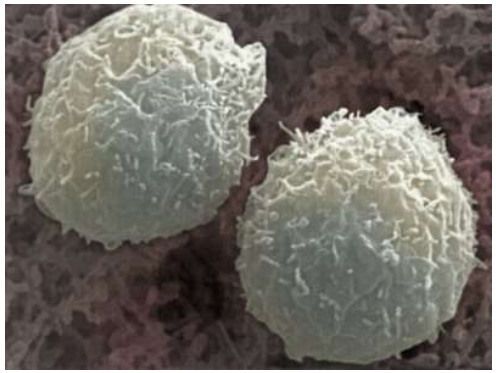
White Blood Cells

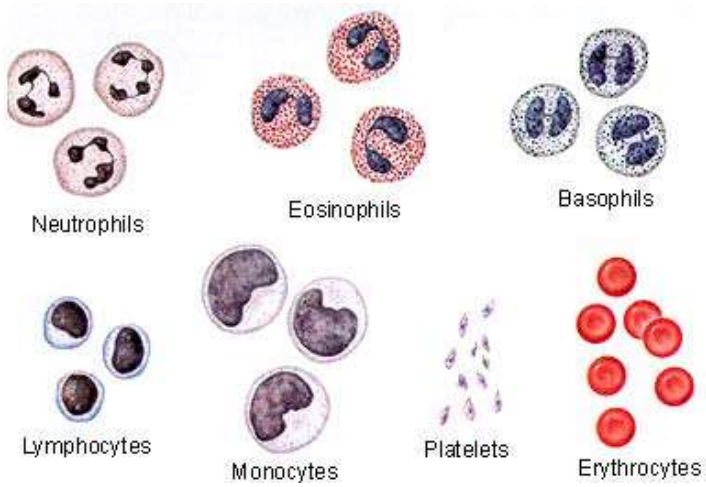


- Leukocytes or WBCs
  - Largest sized blood cells
  - Lowest numbers in the blood (4,500 – 11,000 per microliter)
  - Formed in the bone marrow and some in lymph glands
  - Primary cells of the immune system
  - Fights disease and foreign invaders
  - Contain nuclei with DNA, the shape depends on type of cell
  - Certain WBCs produce antibodies
  - Life span is from 24 hours to several years
  - Size is 8-20 micrometers in diameter
  - There are five different types of WBCs

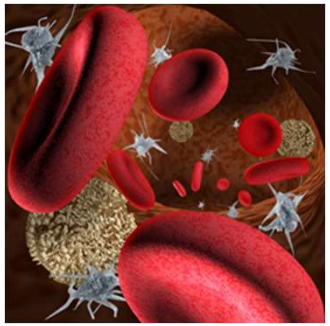
1. Neutrophils
2. Eosinophils
3. Basophils
4. Lymphocytes
5. Monocytes

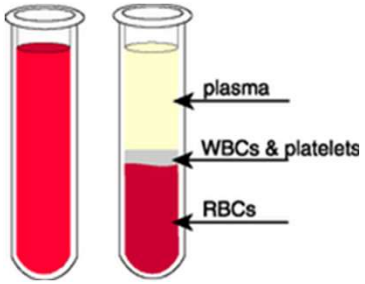




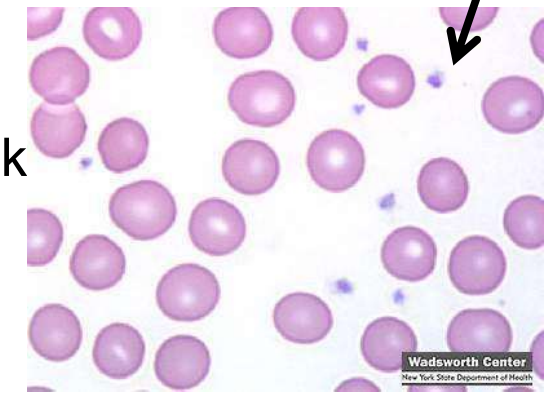


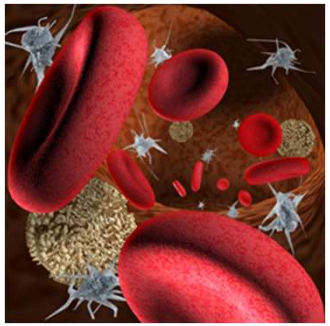
Platelets



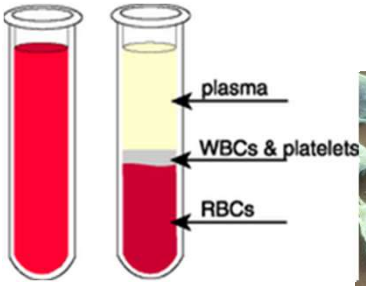


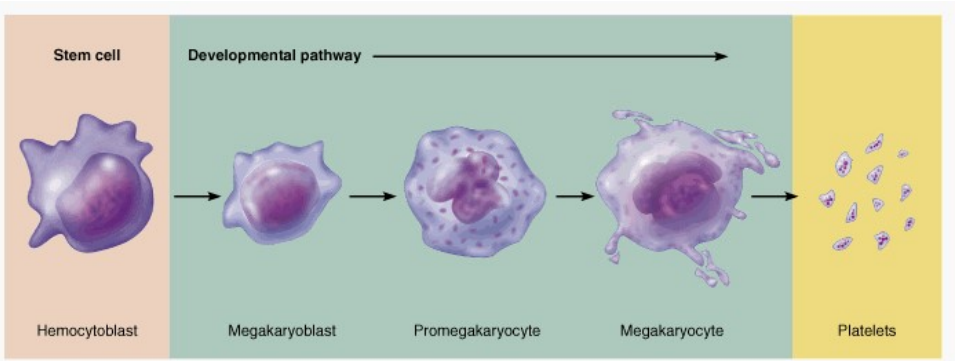
- Thrombocytes or PLTs
- Formed in the bone marrow
- Fragments from the cytoplasm of megakaryocytes
- Smallest of the blood cells
- 1-4 micrometers in diameter
- Shape can be round, oval, or appear spik
- Life span of around 8-12 days

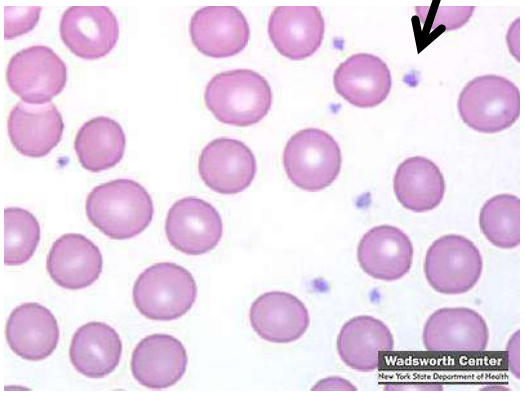




- Platelets
  - — Involved in the clotting process
  - — Seal wounds and prevent blood loss
  - — Help repair damaged vessels
  - — 150,000 – 400,000 per microliter of blood
  - —Platelets stain bluish with reddish or purple granules







Thank You!!!