Life Processes
Composition of Blood

❖ Composition of Blood

Blood is fluid in the body. It has four components-plasma, red blood cells, white blood cells and platelets. It has the function of transporting oxygen and nutrients throughout the body. The blood flows through veins, arteries and capillaries. It has about 55 % plasma and 45% blood cells.

The plasma-The liquid component of blood is plasma. It has water, fat, salts and proteins. Its main function is to transport antibodies, chemical messengers, clotting proteins etc., to the body to maintain the fluid balance.

Red blood cells- They are red making 40-45% of the body cell. Erythropoietin produces the RBCs. They are produced as immature cells in the bone marrow. It takes almost 7 days for their maturation. They lack a nucleus and can change their shape.

White blood cells- They protect the body from infection. They make 1-2% of the blood cell. They are the immediate response cells. Neutrophils and Lymphocytes are the major WBCs. T lymphocytes help to regulate the immune cells. B lymphocytes make antibodies which target bacteria, viruses etc.

Platelets- They are not cells but small fragments of the cell. They participate in the blood clotting process. They gather at the site of the injury. Their higher amount can cause clotting which will lead to a stroke. Antiplatelet therapy will recover this condition.

Blood Basics

- ✓ transporting oxygen and nutrients to the lungs and tissues.
- ✓ forming blood clots to prevent excess blood loss.
- ✓ carrying cells and antibodies that fight infection.
- ✓ bringing waste products to the kidneys and liver, which filter and clean the blood.
- ✓ regulating body temperature.

Importance of Blood & Blood Clotting

Blood clotting, or coagulation, is an important process that prevents excessive bleeding when a blood vessel is injured. Platelets (a type of blood cell) and proteins in your plasma (the liquid part of blood) work together to stop the bleeding by forming a clot over the injury. Typically, your body will naturally dissolve the blood clot after the injury has healed. Sometimes, however, clots form on the inside of vessels without an obvious injury or do not dissolve naturally. These situations can

be dangerous and require accurate diagnosis and appropriate treatment. Clots can occur in veins or arteries, which are vessels that are part of the body's circulatory system. While both types of vessels help transport blood throughout the body, they each function differently. Veins are low-pressure vessels that carry deoxygenated blood away from the body's organs and back to the heart. An abnormal clot that forms in a vein may restrict the return of blood to the heart and can result in pain and swelling as the blood gathers behind the clot. Deep vein thrombosis (DVT) is a type of clot that forms in a major vein of the leg or, less commonly, in the arms, pelvis, or other large veins in the body. In some cases, a clot in a vein may detach from its point of origin and travel through the heart to the lungs where it becomes wedged, preventing adequate blood flow. This is called a pulmonary (lung) embolism (PE) and can be extremely dangerous.

The clotting process occurs in multiple steps.

- ✓ When a blood vessel is injured, platelets become activated.
- ✓ They adhere to the surrounding walls of blood capillaries.
- ✓ Platelets alter their shape to form a plug.
- ✓ The plug fills the injury and prevents blood flow.
- ✓ Clotting factors get activated to accompany the clotting process.
- ✓ They send out signals to one another, triggering a chain of events.
- ✓ In the presence of calcium ions, thromboplastin converts inactive prothrombin into active prothrombin.
- ✓ This also activates fibrinogen.
- ✓ The fibrinogen then converts to fibrin.
- ✓ On the site of injury, fibrin and platelets create a clot.
- ✓ Other proteins prevent the spreading of clots to the surrounding area.
- ✓ As the damaged tissue heals, the body no longer requires the clot.
- ✓ While the damaged tissues heal, the clot will dissolve naturally in the body.
- ✓ The fibrin strands break down.

✓ The blood returns the clot's platelets and cells.