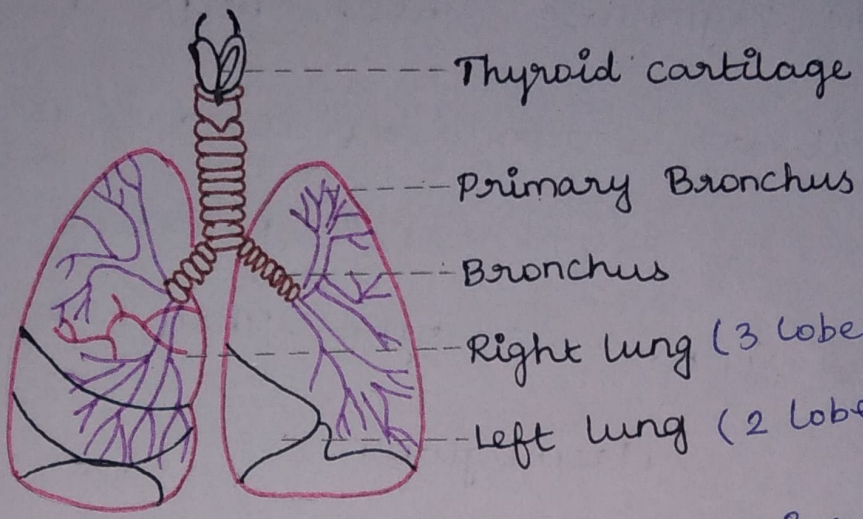
STRUCTURE OF LUNGS



The lungs are roughly cone shaped, with an apex, base, three surfaces and three borders. The left lung is sightly smaller than the right - this is due to the presence of the heart.

Each lung consists of:

Apex: The blunt superior end of the lung. It projects upwards, above the level of the 1st rib and into the floor of the neck.

Base: The inferior surface of the lung, which sits on the diaphragm.

Lobes (two or three): These are separated by fissures within the lung.

Surfaces (three): These correspond to the area of the thorax that they face. They are named costal, mediastinal and diaphragmatic.

Borders (three): The edges of the lungs, named the anterior, inferior and posterior borders.

RESPIRATORY PIGMENTS:

The pigments which helps in carry oxygen as well as carbondioxide are known as respiratory pigments. Respiratory pigments are divided into six types. They are,

* Haemoglobin
* Met Haemoglobin
* Myoglobin
* Haemocyanin
* Chlorocruorin
* Haemoerythrin

Haemoglobin :

*The respiratory pigment present in all mammals.

*It is an example of conjugated protein because it contain proteins and non-protein part.

*The Heme, the non-protein present in 4%

*The globin, the protein present in 96%

*It is present in inside RBC.

*The main function of haemoglobin is gas exchange.

*It is made up of four polypeptide chains, two alpha chains and two beta chains.

*The molecular weight of haemoglobin is 68000 daltons

Met - Haemoglobin :

*Iron compound is in the ferric state from the normal ferrous state is known as met - Haemoglobin.

*It is does not bind with oxygen.

*less than 1% of RBC with met - haemoglobin.

Myoglobin :

*The oxygen binding heme protein present in the muscle or muscle cells is said to be myoglobin

*Myoglobin is a protein with iron and it is made up of 153 amino acids.

*It is made up of 8 alpha chains.

*The molecular weight of myoglobin is 16700 daltons.

Haemoaprin :

*It is blue green copper containing pigment present in certain Crustaceans.

Chlorocruorin :

*Iron containing pigment green in colour

*It is found in polychaetes.

Haemoerythrin :

*Iron containing pigment pink in colour.

*It is found in invertebrates.

TRANSPORT OF GASES :

Blood is the medium of transport of O_2 and CO_2

Transport of oxygen O_2

*Oxygen enters the venous blood in the lungs and leaves the blood stream in tissue capillaries and goes to tissue cells.

*oxygen is carried in the blood in two forms

*As dissolved gas under normal conditions of temperature and pressure about 0.30 ml of O_2 is carried in physical solution in 100 ml arterial blood.

*As chemical compound oxygen is carried in combination with haemoglobin as oxyhaemoglobin.

Transport of carbondioxide CO_2

*Transportation of CO_2 is much easier due to the high solubility in water. It can be in three ways.

*As carbamino compounds CO_2 bind directly with Hb to form unstable carbamino compound (CO_2Hb) 23%, CO_2 transported this way.

*As bicarbonate ions CO_2 combines with H_2O in the presence of carbonic anhydrase (RBC) to H_2CO_3. Then H_2CO_3 dissociate into H^+ and HCO_3^-

*In dissolved state Nearly 7% CO_2 carried in by physical solution under normal temperature and pressure.

CIRCULATION :

COMPOSITION OF BLOOD

*Blood has two main components plasma (ECF) and formed elements.

*The formed elements are enclosed in plasma membrane.

*Erythrocytes, leucocytes and platelets are formed elements.

*The blood vessel wall is three layered - Tunica adventitia, tunica media and tunica intima.

*Leucocytes can be granular (neutrophils, eosinophil, basophil) or agranular (lymphocyte, monocyte).

*Blood 45% formed elements - Hematocrit (RBC)

*Plasma 55% pale yellow which is less dense form supernatant.

*WBC and platelets above RBC, a narrow cream coloured coat.

*Blood plasma - Proteins, enzymes, nutrient, waste, hormones, gases.

*Plasma proteins are broken down into

amino acids by macrophages in liver, gut, spleen, lungs, lymphatic tissue.

*Plasma proteins are carriers of small molecules.

*They are basic (OH^-) more bases.

*During vasallar injury, plasma proteins clot blood.

*They govern water distribution between blood and tissue called colloid osmotic pressure. Three plasma proteins are albumin, globulin and fibrinogen.

FUNCTIONS OF BLOOD:

Blood has three main functions: transport, protection and regulates.

Transport:

*Blood transports the following substances;

*Gases, namely oxygen (O_2) and carbondioxide (CO_2) between the lungs and rest of the body.

*Nutrients from the digestive tract and storage sites to the rest of the body.

*Waste products to be detoxified or removed by the liver and kidneys.

*Hormones from the glands in which they are produced to their target cells.

*Heat to the skin so as to help regulate body temperature.

Protection:

*Blood has several roles in inflammation:

*leukocytes, or white blood cells, destroy invading microorganisms and cancer cells.

*Antibodies and other proteins destroy pathogenic substances

*Platelet factors initiate blood clotting and help minimise blood loss.

Regulation:

*Blood helps regulate

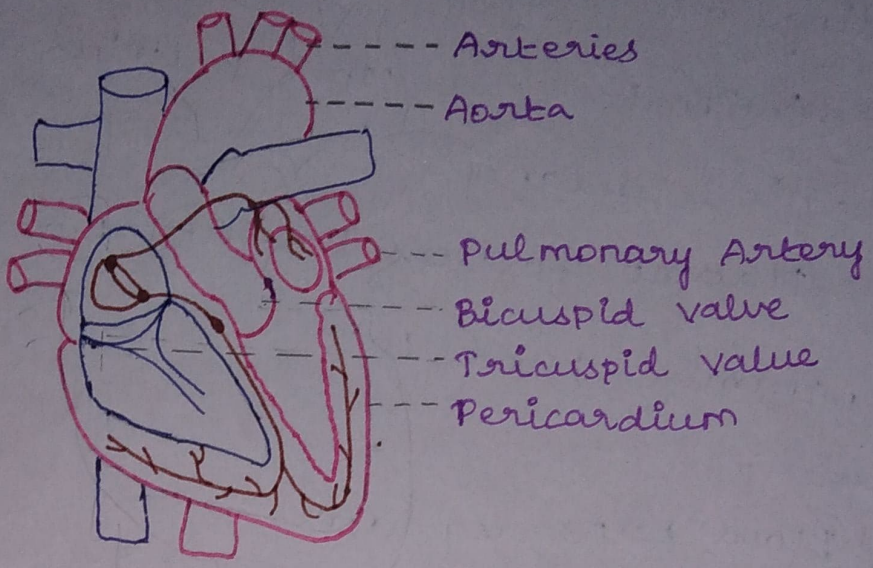
*PH by interacting with acids and bases.

*Water balance by transferring water to and from tissue.

CLOTTING

This is the last and most effective defanse against bleeding. During bleeding, it is important for the blood to clot quickly to minimise blood loss, but it is equally important for blood not to clot in undamaged vessels. Coagulation is very complex process aimed at clotting the blood at appropriate amounts. The objective of coagulation is to convert plasma protein fibrinogen into fibrin, which is a sticky protein that adheres to the walls of a vessel.

HEART



*Heart is located in the middle of the chest and slightly towards the left.

*The heart is a large muscular pump and is divided into two halves - the right hand side and the left hand side.

*The right hand side of the heart is responsible for pumping deoxygenated blood to the lungs.

*The left hand side pumps oxygenated blood around the body.

*Each side of the heart consists of an atrium and a ventricle which are two connected chambers.

*The atria are where the blood collects when it enters the heart.

*The ventricles pump the blood out of the heart

to the lungs or around the body.

*The septum separates the right hand and left hand side of the heart.

*The tricuspid valve is located between the right atrium and right ventricle and opens due to a build-up of pressure in the right atrium.

*The bicuspid valve is located between the left atrium and left ventricle and likewise opens due to a build-up of pressure, this time in the left atrium.

*The Semilunar valves stop the back flow of blood into the heart. There is a semilunar valve where the aorta leaves the left ventricle and another where the pulmonary artery leaves the right ventricle.

FUNCTION

*Pumping oxygenated blood to the other body parts.

*Pumping hormones and other vital substances to different parts of the body.

*Receiving deoxygenated blood and carrying metabolic waste products from the body and pumping it to the lungs for oxygenation.

*Maintaining blood pressure.

References :

Net-sources

Verma, Agarwal