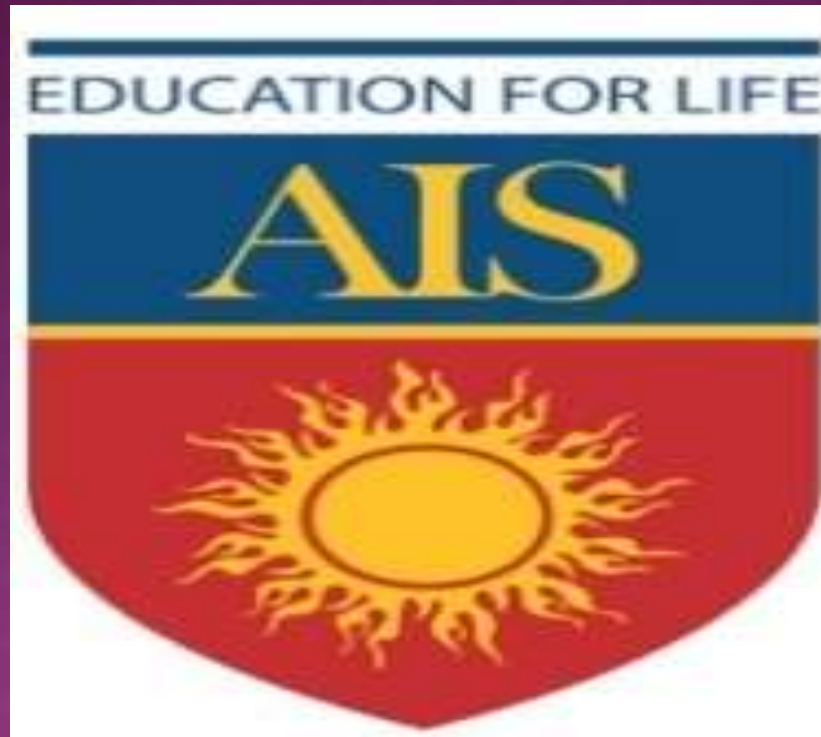




TRANSPORTATION IN HUMANS

TRANSPORTATION IN HUMANS

- ❖ Transportation in humans is done by the circulatory system.
- ❖ The circulatory system in humans mainly consists of blood, blood vessels and heart.
- ❖ It is responsible for the supply of oxygen, nutrients, removal of carbon dioxide and other excretory products.
- ❖ It also helps to fight the infections.

BLOOD

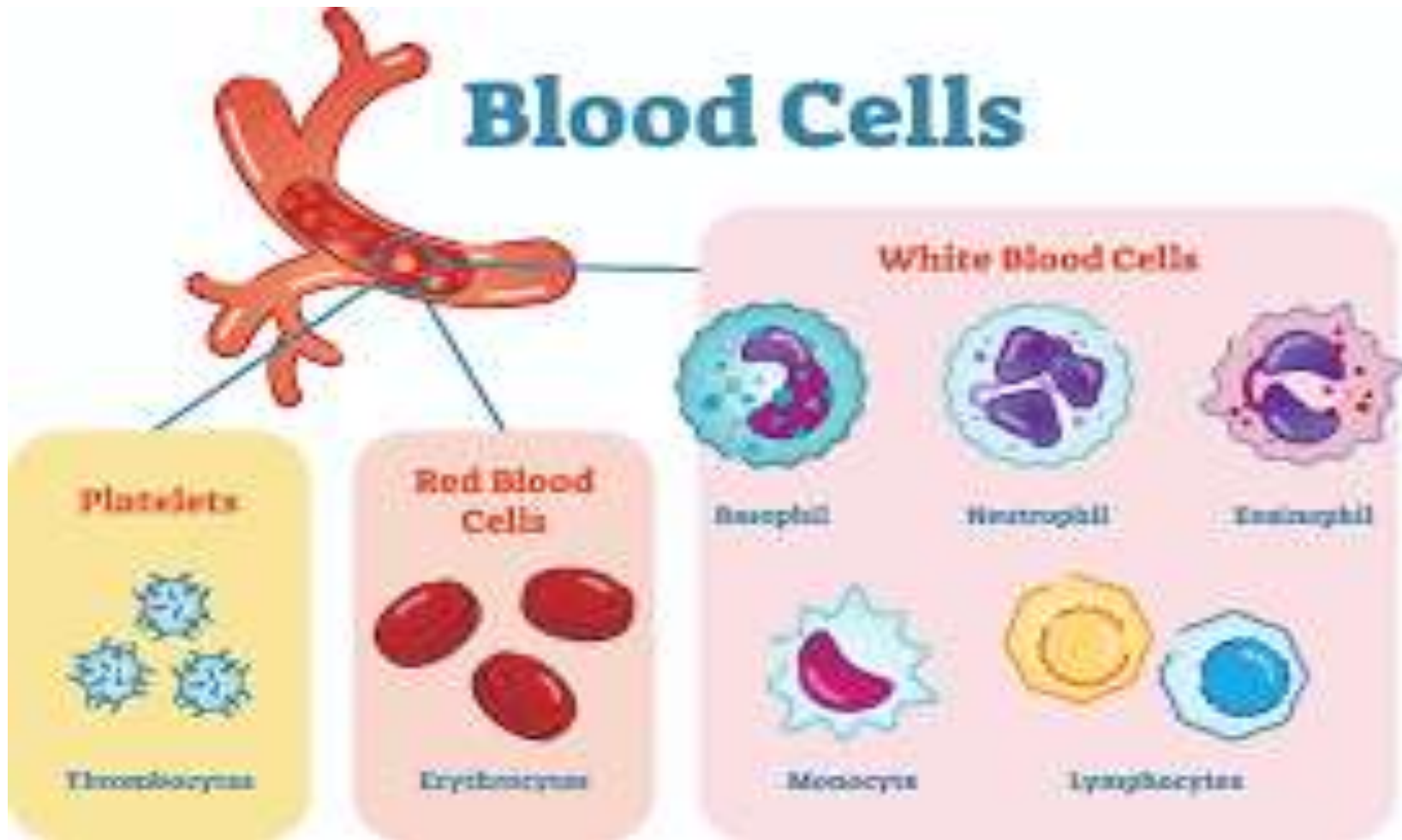
- ◉ (i) It is a fluid connective tissue.
- (ii) Components-
 - (1) Fluid medium- Plasma (2) Red blood corpuscles (3) White blood corpuscles
 - (4) Platelets suspended in plasma
- (iii) Plasma transports food, Oxygen, Carbon dioxide, Nitrogenous wastes, etc.

DIFFERENCES

Differences between RBC, WBC & Platelet

	Erythrocytes	Leucocytes	Platelets
Origin	red bone marrow	lymph nodes and spleen	megakaryocytes (fragments)
Life span	120 days	13-20 days	5-9 days
Nucleated/ Non nucleated	non nucleated	nucleated	non nucleated
Shape	biconcave	irregularly shaped	irregularly shaped
Count	5-5.5 millions per mm ³	6000--8000 per mm ³	1,500,00-3,500,00 per mm ³
Color	red due to presence haemoglobin	white due to lack of haemoglobin	purple
Types	one	granulocytes and agranulocytes	one

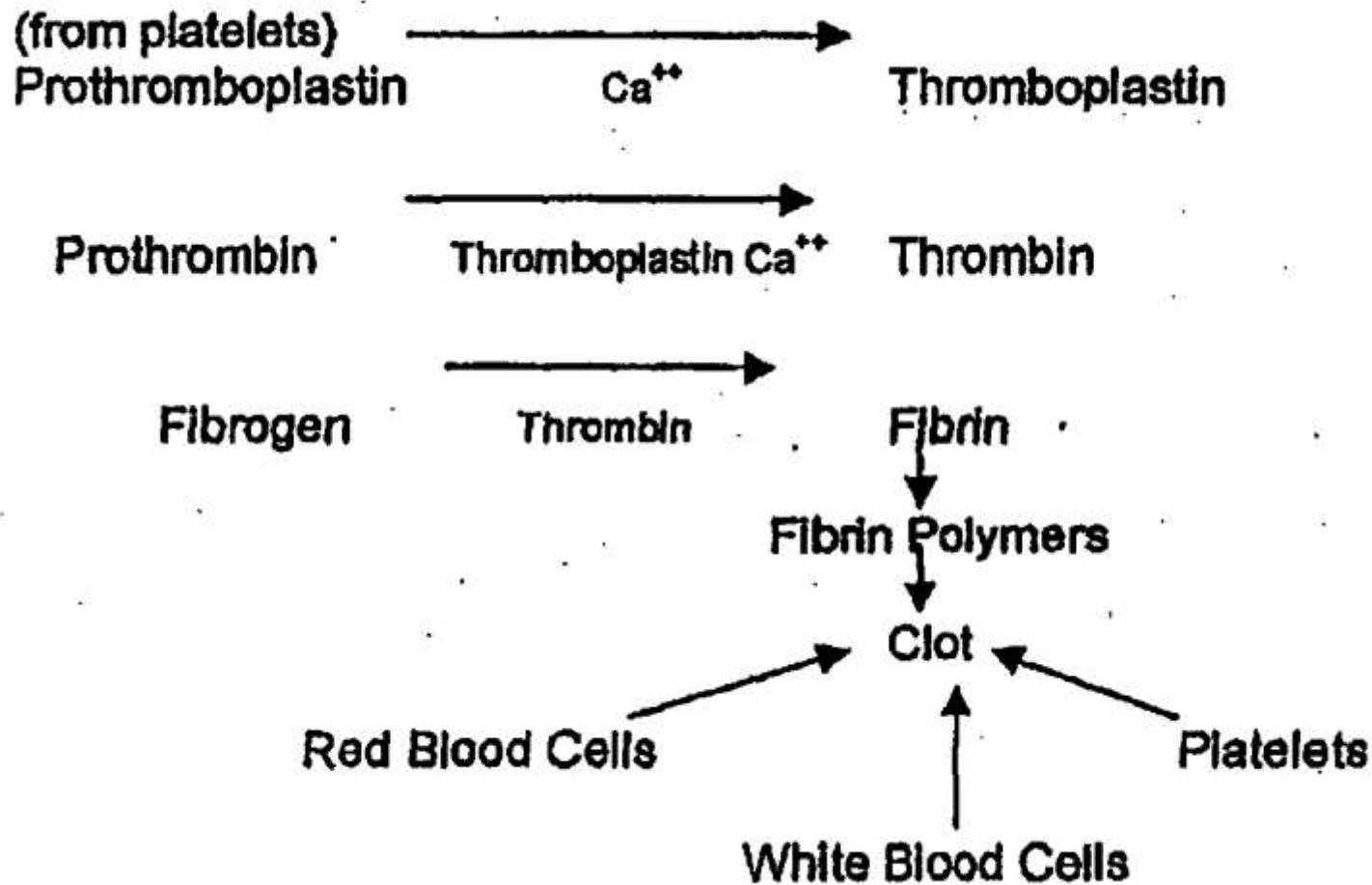
SMEAR OF BLOOD CELLS



FUNCTIONS

- ◉ Platelets help the blood to clot. Clotting stops the blood from flowing out of the body when a vein or artery is broken.
- ◉ Red blood cells carry oxygen to different parts of the body.
- ◉ White blood cells ward off infection.

PROCESS OF BLOOD CLOTTING



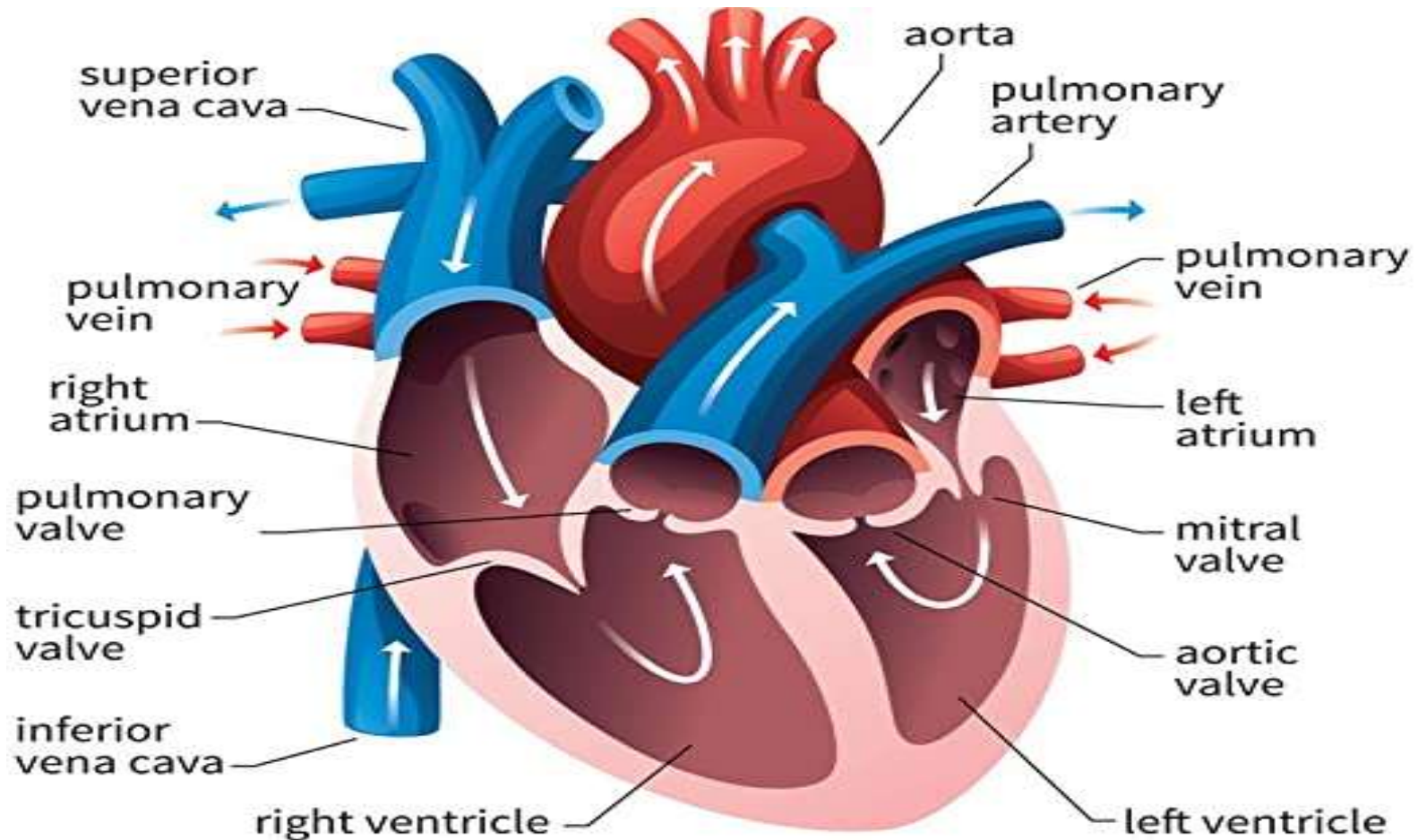
FUNCTIONS OF BLOOD

- ◉ (i) Transport of respiratory gases.
- ◉ Haemoglobin is an iron containing pigment which transports oxygen to all the cells and tissues of the body
- ◉ $\text{Hb} + \text{oxygen} \rightleftharpoons \text{oxyhaemoglobin (unstable)}$
- ◉ $\text{Hb} + \text{CO}_2 \rightleftharpoons \text{Carbaminohaemoglobin (stable)}$
- ◉ $\text{Hb} + \text{CO} \rightleftharpoons \text{Carboxyhaemoglobin}$
- (ii) Transport of nutrients.
- (iii) Transport of waste products.
- (iv) Defence against infection

HEART

- ❖ The muscular organ which is located near the chest slightly towards the left in the thoracic region.
- ❖ The heart is the main pumping organ of the body.
- ❖ The human heart is divided into four chambers which are involved in the transportation of oxygenated and deoxygenated blood.
- ❖ The upper two chambers are called atria whereas the lower two chambers are called as ventricles.

SECTIONAL VIEW OF THE HUMAN HEART



THE FLOW OF BLOOD THROUGH THE HEART IS AS FOLLOWS:

Circulation

- ❖ Veins collect deoxygenated blood from different parts of the body → Right atrium
- ❖ Right atrium → Right ventricle
- ❖ Right ventricle → Pulmonary arteries
- ❖ Pulmonary arteries → Lungs
- ❖ Lungs → Pulmonary veins
- ❖ Pulmonary veins → Left atrium
- ❖ Left atrium → Left ventricle
- ❖ Left ventricle → Arteries carry oxygenated blood to different parts of the body.

- ❖ The covering of the heart is known as **PERICARDIUM**. **Pericardial fluid** acts as a shock absorber and provides lubrication.
- ❖ Ventricles have thicker walls than atria. This is because blood is pumped out of the heart at greater pressure from these chambers compared to the **atria**.
- ❖ Left ventricle has thicker walls than right ventricle this is due to the higher forces needed to pump blood through the systemic circuit (around the body) compared to the pulmonary circuit.

SYSTOLE AND DIASTOLE

- ❖ When the heart chambers contracts the phase is known as Systole
- ❖ When the heart chambers relaxes the phase is known as Diastole.
- ❖ The heart sound is LUBB-DUP
- ❖ The cardiac cycle comprises a complete relaxation and contraction of both the atria and ventricles and lasts for 0.8 seconds
- ⦿ PULSE : The impulse transmitted to arteries by contraction of the left ventricle of the heart.

BLOOD VESSELS

- ❖ Blood vessels carry blood throughout the body.
 - ❖ There three types of blood vessels; arteries, veins and blood capillaries.
- Blood Vessels
- ❖ Arteries carry oxygenated blood and veins carry deoxygenated blood.
 - ❖ Gaseous exchange takes place between blood and cells at capillaries.

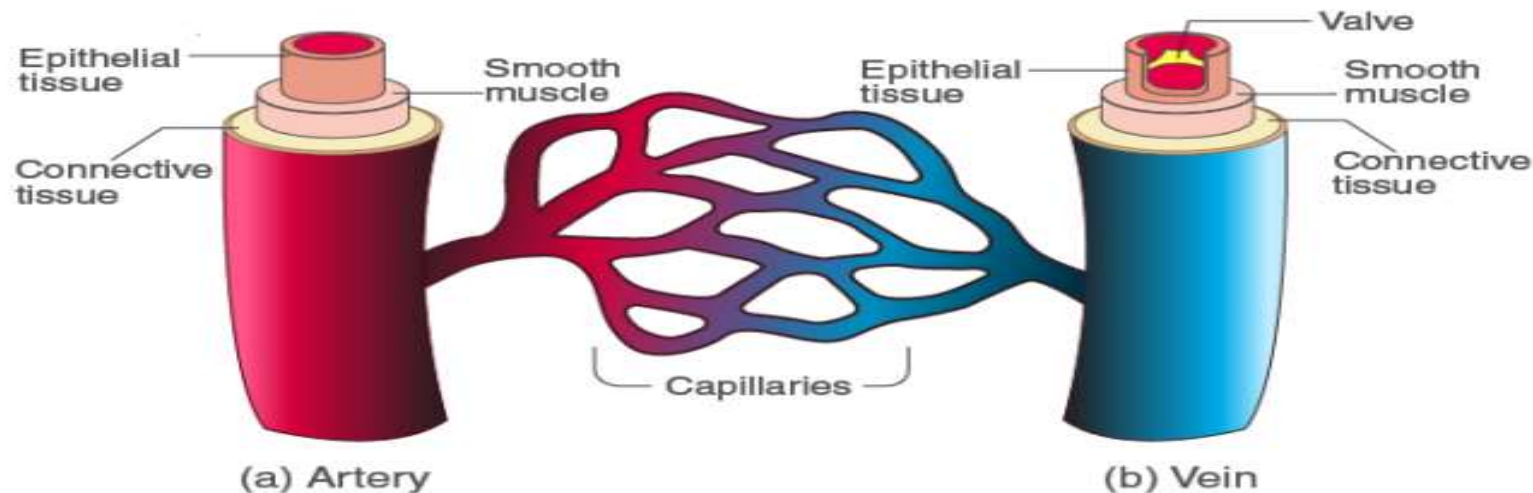
DIFFERENCE BETWEEN ARTERIES AND VEINS

Difference between Arteries and Veins

Sr No	Arteries	Veins
1	An artery carries blood away from heart	A vein carries blood towards the heart
2	An artery is thicker than a vein	A vein is comparatively thinner
3	The Pulmonary artery carries deoxygenated blood	The pulmonary vein carries oxygenated blood
4	Arteries have rigid walls	Veins have comparatively thinner walls
5	Blood flows under pressure through an artery	Blood flow through vein is much calmer
6	Lumen of arteries is narrow	Lumen of veins is comparatively wider

CAPILLARIES

- Form the connection between arteries & veins.
- Walls are one cell thick only for easy exchange of blood.



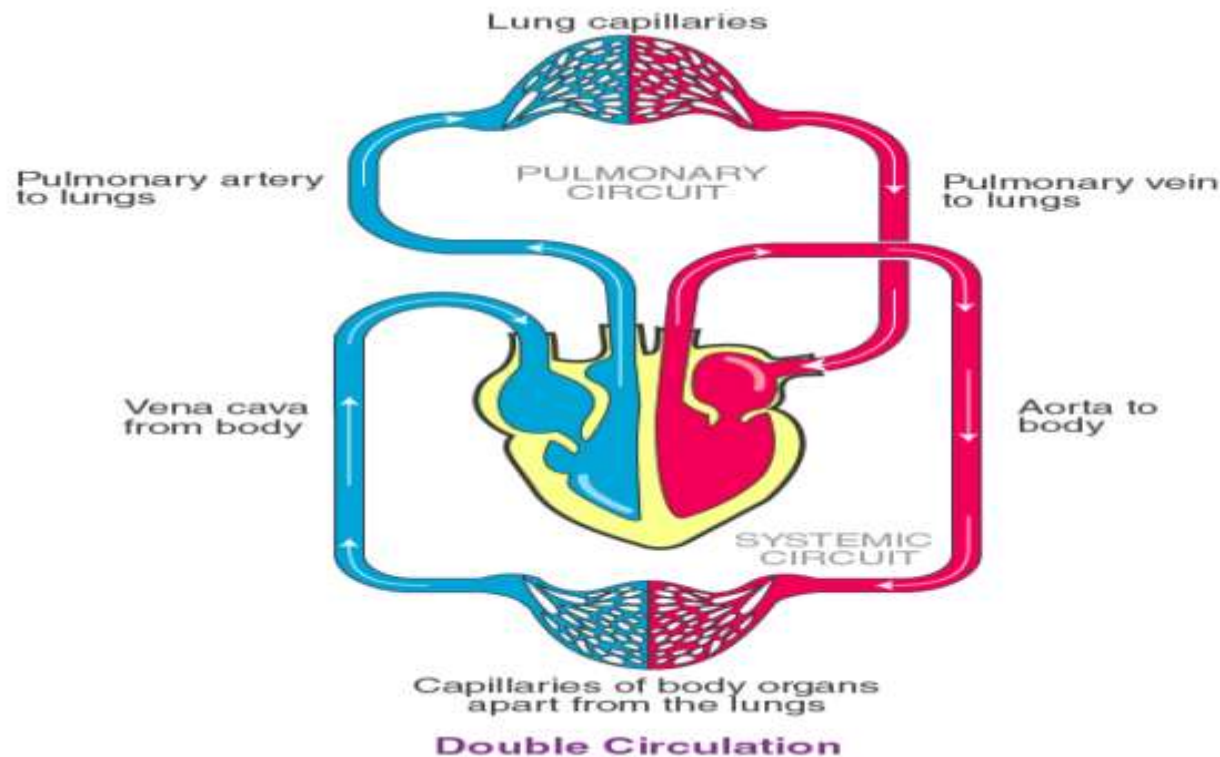
Difference Between Arteries and Veins

BLOOD PRESSURE

- ◉ The pressure exerted by the blood when it flows through the blood vessels is called blood pressure.
- ◉ There are two different variants of blood pressure; the systolic and the diastolic blood pressure.
- ◉ The pressure exerted on the walls of arteries when the **heart is filling** with blood is called **diastolic** pressure. It constitutes the **minimum** pressure on arteries.
- ◉ The normal range of diastolic blood pressure should be 60 - 80 mm Hg.
- ◉ The pressure exerted on the walls of arteries when the **heart is pumping** the blood is called **systolic** pressure. It constitutes the **maximum** pressure applied on the arteries.
- ◉ The normal range of systolic blood pressure should be 90 - 120 mm Hg.
- ◉ The apparatus which is used to measure blood pressure is **SPHYGMOMANOMETER**.

DOUBLE CIRCULATION

- ◉ In the human body, blood circulates through the heart twice.
- ◉ Once it goes through the heart during pulmonary circulation and second time during systemic circulation.
- ◉ Hence, circulation in human beings is called double circulation.



LYMPH

Extracellular fluid similar to plasma but colourless with lesser protein.

◆ Function of lymph-

(i) Transportation of digested & absorbed fats from the small intestine.

(ii) Drains excess fluid from the intercellular spaces back in the blood.

◆ Higher animals- E.g., birds, mammals.

(i) Oxygenated blood & Deoxygenated blood are completely separate for efficient Oxygen supply.

(ii) This is to fulfil higher energy needs and to maintain body temperature (warm blooded animals).

◆ Amphibians & reptiles- have 3 chambered heart where little mixing of Oxygenated blood & Deoxygenated blood takes place. Therefore their body temperature varies with the temperature of the environment. (cold blooded animals)



Thank
You

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