



Internal structure of the human heart

15/2/12

Ⓐ Circulatory System

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1 The vein which brings oxygenated blood to the heart from the lungs:

= Pulmonary vein

2 The path which the blood flows through during pulmonary circulation is:

= RA → RV → Pulmonary arteries → Lungs → Pulmonary veins → LA

(i) In which organ of our body does blood get oxygenated?

= Lungs is the organ of our body where blood gets oxygenated.

(2) Which side of the heart (left or right) contains oxygenated blood?

= Left side of the heart contains oxygenated blood.

Name the following:

(a) Three kinds of blood vessels.
Arteries
= Veins and capillaries

(b) Two types of blood circulation in the human body = Pulmonary and Systemic
Systemic circulation

(c) The membranous structure which divides the heart into a right and a left portion.

Septum

(d) The structure responsible for starting electrical impulses that cause the heart to contract and relax in order to keep pumping blood.
= Sinoatrial node / SANode

(e) The Scientist who identified different types of blood groups.
= Karl Landsteiner

(a) Circulatory system: The transport system ^{in human beings and animals} which helps in the transport of nutrients and oxygen and the removal of metabolic waste and which comprises of heart, blood vessels and blood is called circulatory system.

Blood - The red coloured, viscous, salty, ⁱⁿ taste, slight alkaline fluid connective tissue that contains Plasma with RBC, WBC and platelets and circulates through arteries, veins and blood capillaries and heart is called blood.

Lymph - The pale yellow coloured fluid, that ^{connective tissue} does not contain RBC and Platelets but contains WBC and Plasma and flows in lymphatic vessel and supplies nutrition and oxygen to those parts where blood cannot reach is called Lymph.

d) Artificial pacemaker: The mechanical device that is placed surgically in humans if their SA node is damaged or if the electrical conduction system of the heart has problems.

Long Answer Question

Differentiate between the following

(a) Pulmonary artery and pulmonary vein
(kind of blood)

Pulmonary artery	Pulmonary vein
It is the artery that carries deoxygenated blood to from the right ventricle of the heart to the lungs for oxygenation.	(i) It is the artery that carries oxygenated blood from the lungs to the left atricle of the heart.

(b) Artery and veins (direction of blood)

= Artery

Vein

(i) Arteries carry blood from the heart to various parts of the body.

(i) Veins carry blood from the different parts of the body to the heart.

(c) Closed and Open vascular system (definition)

= Closed vascular system

Open vascular system

(i) The type of blood circulatory system in which blood flows through blood vessels and its flow is regulated by the heart.

eg: In human beings.

(i) The type of blood circulatory system in which blood mostly flows through open spaces i.e. blood flows from the heart to the body tissues without vessels.

eg: In Insect. Insects

(d) Bicuspid and Tricuspid Valve (location)

= Bicuspid valve Tricuspid Valve

(i) Bicuspid valve is located between the left auricle and the left ventricle. (ii) It has two cusps.

(i) Tricuspid valve is between the right auricle and the right ventricle. (ii) It has three cusps.

(e) Blood and lymph (composition)

= Blood Lymph

(i) Blood contains RBC's, WBC, and blood plasma with blood platelets and proteins.

(i) Lymph contains WBC's (mostly lymphocytes) and blood plasma without blood platelets and proteins.

2 Important roles :-

(a) Pericardial fluid = ~~Important roles~~.
The space between

the two membranes is filled with called pericardium is filled with a fluid called pericardial fluid which protects the heart from shocks, jerks or any

mechanical stress.

(b) Aorta :- It is the largest artery which brings oxygenated blood from the left ventricle of the heart and supplies the blood to all parts of the body through arteries or branches.

(c) Vena Cavae :- Vena Cavae brings ~~deoxy~~ deoxygenated blood from the rest of the body to the heart.

(3) Name any four heart-related conditions that occur commonly in humans. Briefly explain the cause and symptoms of each of them.

= The four heart-related conditions that occur commonly in humans are :-

- (i) Palpitation
- (ii) Hypertension
- (iii) Heart Attack
- (iv) Cardiac arrest.

(i) Palpitation = Palpitation i.e. the heart beating too fast or too hard. Most of the time is most of the time caused by stress and anxiety. It is an indication of a most serious heart condition specially if it is accompanied by shortness of breathe, dizziness or chest pain.

(ii) Hypertension = cause :- It occurs in a person when blood flows through the blood vessels with a force greater than normal.

Symptoms :- Irritability, dizziness.

(iii) Heart Attacks :- Cause :- sudden interruption of blood supply to the heart. It usually occurs due to a blood clot that prevents the flow of oxygen rich blood to the cardiac muscle.

Symptoms :- uncomfortable, uncomfortable pressure, tightness or squeezing pain in the centre of the chest; ~~an~~ shortness of breath, etc.

(iv) Cardiac arrest - = Cause :- Coronary artery disease where in the walls of arteries ~~the~~ thicken as a result of fat or plaque deposition. Less common causes include major blood loss, lack of oxygen, low potassium levels, heart failure.

Symptoms :- ~~Unconscious~~ Unconsciousness, abnormal breathing.

(4) Give the functions of lymph.

= The functions of lymph are :-

(i) Nutritive = It supplies nutrition and oxygen to those parts where blood cannot reach.

(ii) Drainage = It drains away excess tissue fluid and metabolites and returns proteins to the blood from tissue parts spaces.

(iii) Absorption : Fats in the intestine are absorbed through lymph vessels (or lymphatics).

(iv) Defence : Lymphocytes and monocytes of the lymph function to protect the body. The lymphatics also remove bacteria from the tissues.

(5)

Explain : (a) Universal donor

= The blood group 'O' can be given to all the groups. Hence as it has neither 'A' or 'B' antigens. A person with 'O' blood group is called a universal donor.

(b) Universal recipient = The blood group 'AB' can only be given to AB group but a person with AB type of blood can receive blood from all types. Both antigen A and B belong to AB blood group. Hence it is called Universal recipient.

(c) During surgical operations or during accidents, the patient may be given blood from the outside to save his life. What is the technical name of this process? Briefly explain the precautions to be observed and taken in this process.

= The technical name of the process is blood Transfusion.

The precautions to be taken in this process are:

(i) Blood should be taken only from a healthy person.

(ii) Before transfusion ~~is~~ the matching of the blood groups has to be done.

(iii) The surgical instruments used in this process should be properly sterilised.

7 Given alongside is a diagram of the human heart showing its internal structure. Label the parts marked 1 to 6, and answer the following questions.

(a) Which type of blood is carried by the blood vessel marked 2?

(b) Name the main artery which takes the blood from heart to different parts of the body.

(c) Which chamber of the heart receives deoxygenated blood from the body?

- =
- (a) Deoxygenated blood
 - (b) Aorta
 - (c) Right auricle