BODY FLUIDS AND CIRCULATION

Blood

Blood Is a mobile connective tissue corn posed of a fled, plasma and the cells, the blood corpus•cles. It forms about 30-3 S% of the **extracellular** fluid. **It is slightly alkaline fluid having p H7.4_**

> **Plasma is straw coloured** viscous fluid **that constitutes 55%** of blood **volume. It consists** of 90-92% **water. 8%** protein (fibrinogens, albumins and **!globulins"**, glucose, amino acids and **small** amount of minerals **like Na*, fa++, Cl- etc_**

- **Enithrocytes, leucocytes and platelets are collectively called farmed dements.**
- **Erythrocytes. Total** blood count of ci8Cs Is 5.53 million,. which is slightly less In females due to menstruation. It is **formed in bone marrow_ Nucleus is absent in mammalian RBCs having biconcave in shape_**
- Evefy 200 m I of blood contain **12.16** sm, of haemoglobin, They have life span of 120 days. They are **~~destroyed in spleenil graveyard~~** of RBCs).
- **LeixaCytes or WBC5 are colourless** clue to absence of haemoglobin, 6003.81:00 WeCs are present in each **of blood.**
- **The 1;liFferent** types **01 white blood cells (leukocytes) include neutrciphils, besophils,** epsinophils, ilyrnphocletes.„ mono es, and macrophages.

- rieutrophils are most abundant and basophils are least abundant WBCs. Monoryrtes and ne utrophi Is are phagocylic cells which destroy foreign organisms,
  Basophils sacrela. histamine. serotonin and heparin that involve in inflammatory reactions.
- Eosinophi Is resist infection and allergic reactions. B and T lymphocytes are responsible for immune response of the body.

Thronrkluocytes or platelets. are cell fragments produced from megakaryoryi;es in bone marrow_ 151:1(00 -351.11)1:1C1 'platelets are present In each rill of blood. Platelets. are involved in clotting or coagulation of blood In case of injuries.

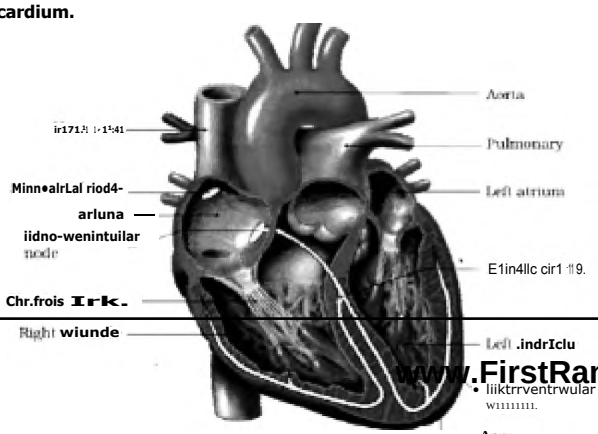
Blood Groups— blood of human being's differ in certain aspects although it appear same in all individuals. Two main hives of grouping are ADO and Rh_
ABO grouping i based on presence or aOsericeiyf two surface antigens KBC, antigen A and antigen B. The plasma of an individual also contains two antibodies orodueed in yes se of anti pis_

Blood Group	Antigens on ROCS	Antibodies in Plasma	Donoes Group
A	A	Anti •B	A..0
8	B	Anti •A	121 O
AB	A	Nil	ABA, B.., O
D	INtl	Anti•A,B	O

* Group 'Or blood can be donated to any individual with any blood group, so it is called universal &mar.
a Person with "AEl' blood group can receive blood from any person of any group, so It is called universal recipient.
Rh grouping _ Rh antigen (similar to Rhesus monkey) are observed on surface of RBC of majority *of* individuals (about 809q• Such people are called Rh positive (Rh-Fil and whom in which this antigen is absent are called Rh negative Rh).

4 Erythroblastnsis. foetal's- If father's MCC! is Rh+ and rrbpther blood is 1111-.. the foetus blood is Rh+. EN ring the delivery of first child there is a possibility of exposure of rnother blood with foetus blood to develop antibodies in mother blood. In subsequent pregnancy tte mother blood can leak into foetus blood that destroys the foetus RBC. This case is called erythroblastosis foetalis.

Circulatory Pathways
Human Circulatory System — consists of 4 chambered muscular heart, closed branching. blood Mussels and circulatory fluid blood,
Heart is the mesodermal lye derived muscular organ, riv@s.eint in thoracic cavity between the two lungs protected hy double membrane of pericardium.



Aprx

The opening between right atrium and right ventricle is .guarded by a three muscular flaps or cusps called tricuspid valve. Bicuspid or mitral valve surds the left atrium and ventricle,

- The opening of right and left ventricle to pulmonary artery and aorta respectively is controlled by semi lunar valve.
- The nodal tissue present on upper right corner of right atrium is called SAN (sino•atrial node and those on lower left corner of right atrium i5 called AVKI atrio-wentricular node)_
- The purkinje fibres along with right and left bundles form the bundle of HIS. The nodal musculature has ability to generate action potential.

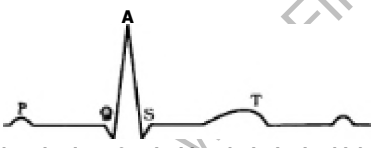
70- SAN generate maximum number of action potential and is responsible for rhythmic contraction of heart. Therefore it is called pace maker_

Cardiac CYde

- To begin with. ail four chambers are in relaxed state called joint dis ystole.

• SA node generates aCtiOn potential that contracts the both atria iatrial systole}, The action potential is passes to AV node and bundle of HIS transmit it to ventricular musculature to cause ventricular systole. At the same time atria undergoes relaxation disystale to close the bicuspid and tricuspid valve_

■ Dud ng each cardiac cycle two sounds are produced. The first sound Dub) Is due to closure of bicuspid and tricuspid valve and 2nd heart sou nd (dub) is due to closure of semilunar valve. ECG (Ellectrck arcllagraphj is a graphical representation of electrical activity of heart Owing cardiac cycle,



- The P • wave represents the electrical excitation of atria (depolarintion) which leads to contraction of atria_
- The P RS-wave represents the depolarization of ventricles, which initiates the ventricular contraction.
- The T -wave represents the return of ventricle from exited to normal state irepolarization). At the end of T -wave marks the end of systole. Cou nting the number of QRS. complex in gwen period of time determine the heartbeat rate.

Double Clreulati4x1

Flow of same blood twice through the heart once In ongenated form and other In deoxygenated form Is called double circulation_ It it eludes systematic and pulmonary circulation.

Systematic circulation includes flow of oxygenated blood for the left ventricle to all parts of body and deoxygenated blood from various body parts to the right atrium. All systematic circulation starts form aorta and ends at superior vena cava, inferior vena cava or coronary sinus to right atrium.

Pulmonary Circulation

The flow of deoxygenated blood from the right ventricle to the lungs and the return of oxygenated blood form the lung to the left atrium is called pulmonary circulation.

Regulation of Cardiac Activity

Normal activities of heart are regulated by nodal tissue (SA and AV node), so the heart is myogenic. A special neural centre in medulla oblongata moderates the cardiac function by A115. Sym pathetic nerve controls the can increase the rate of heart beat and parasympathetic neore of ANS- decrease the rate of heart beat. Adrenal medullar hormone also increases the cardiac output_

Disorder of Circulatory System

a) Hypertension [high blood pressurel — pressure higher than (120/80) is called hypertension that is pumping pressure and 84 mm Hg is the diastolic, resting pressure, It leads to heart disease and affect vital organs like brain and kidney.

13)· Coronanr Artery Disease IICA011- EDMMonly called atherosclerosis that affects the Mood vessels that supply blcho-d to heart muscles the to. deposition of fat. calcium.. cholesterol that makes the arteries lumen rt. ITOWE 1.

c] Angina - also called angina pectoris, acute chest pain clue to less 54apply of oxygen to heart muscles_ It may Our in elderly male and female. It occurs due to restricted blood flow_

d] I-leant failure- heart net pumps enough blood te meet the requirement of !New _ It i5 also known as congestive heart failure because congestion of lung is one of its causes. Heart failure is different from heart attack (heart muscle is damaged by inadequate blood supply) and cardiac arrest (when heart stops beating

e) Coronary Thrombosis- formation of clot in the coronary artery is coronary thrombosis. It occurs most frequently in the left anteripr descending coronary artery_