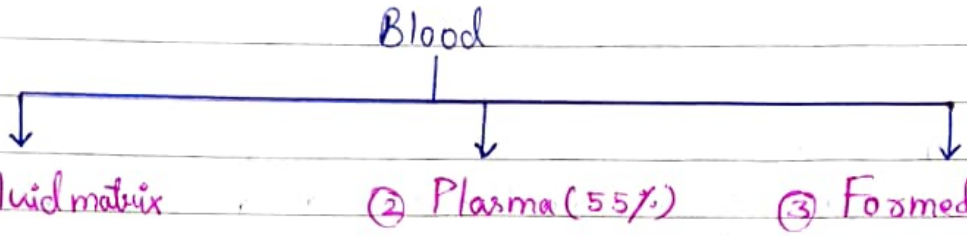
Circulatory and lymphatic system

Structure of Blood Components

→ Blood is a special connective tissue consisting of fluid matrix, plasma and formed elements.



① Fluid matrix

→ The fluid matrix of the blood is called the plasma.
→ Fluid matrix is consists of plasma and some formed elements. Matrix is the ground substance of a tissue or a non-living substance occupying space between cells.

② Plasma

→ Plasma is a straw colour viscous fluid.
→ This consists nearly 55% of the blood.
→ 90-92% of plasma is water and proteins contribute 6-8% of the plasma.
→ Fibrinogen, Globulin and Albumin are the major protein.

① Fibrinogen
Fibrinogen are needed for clotting, coagulation of blood.

② Globulin
Globulin involve in defence mechanism of the body.

③ Albumin
Albumin helps to maintain osmotic balance.

→ Plasma also contain small amount of minerals like Na^+, Ca^{2+}, Mg^{2+}, etc. glucose, amino acids, lipids are also present in the plasma.

→ Plasma without the clotting factor is called serum.

(3) Formed elements

i) Erythrocytes

→ Erythrocytes of red blood cells are the most abundant of all the cells in blood.

→ A healthy adult man has on an average 5-5.5 millions of RBCs mm^{-3} of blood.

→ RBC are formed in the red bone marrow in the adults.

→ RBCs are devoid of nucleus in most of the mammals and are biconcave in shape.

→ They have red colour, iron containing complex protein called haemoglobin. A healthy individual has 12-16 gm of haemoglobin in every 100 ml of blood.

→ These molecules play a significant role in transport of respiratory gases.

→ RBCs have an average life span of 120 days. after which they are destroyed in the spleen (Graveyard of RBCs)

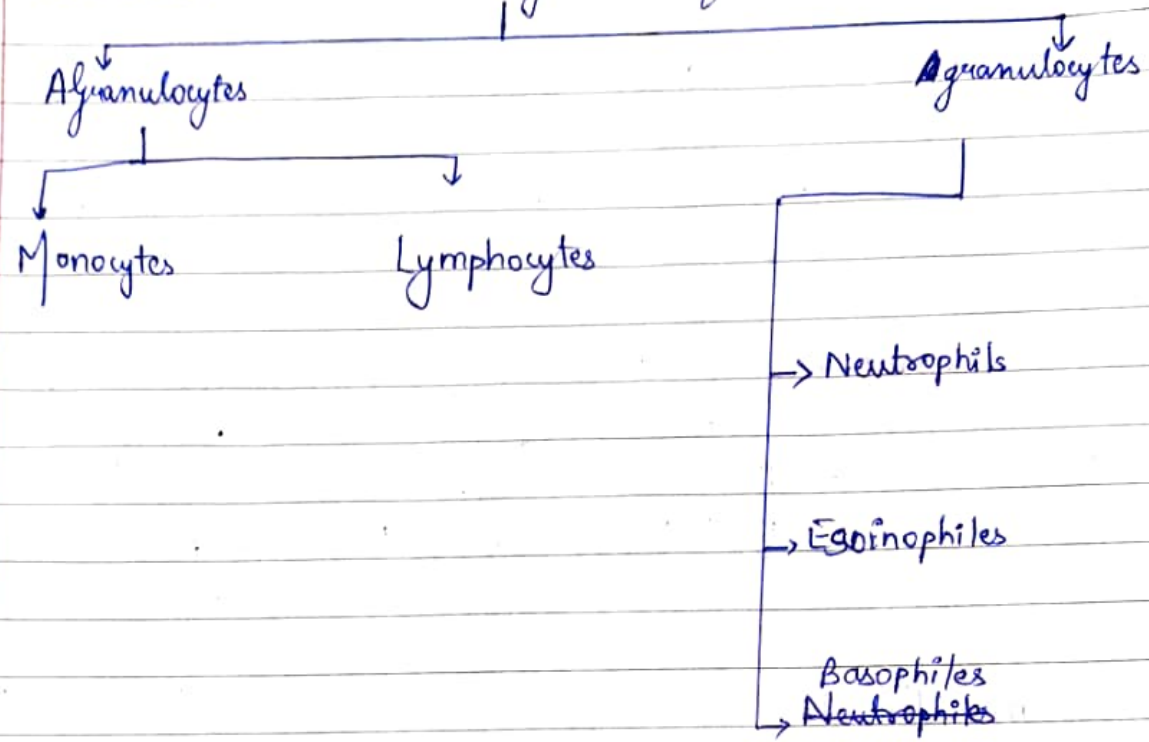
ii) Leucocytes

→ Leucocytes are also known as white blood cells (WBCs) As they are colourless due to the lack of haemoglobin.

→ They are nucleated and are relatively lesser in no. with average 6000-8000 mm^{-3} of blood.

→ 2-3 weeks
→ 15-20 days

→ Lymphocyte Leucocytes are generally short lived.
→ We have 2 main categories of WBCs.



Granulocytes

→ Neutrophils, Eosinophiles, Basophiles are the 3 parts.

i) Neutrophils → Neutrophils are the most abundant cells of the total WBCs ie. 60-65 %.
→ Neutrophils are the phagocytic cells which destroy foreign organism entering the body.

ii) Basophils → Basophils are present in least amount ie. 0.5 - 1 % of the total WBCs.
→ Basophils secreate histamin, serotonin, heparin, etc and are involved in inflammatory reaction.

iii) Eosinophiles → Eosinophiles is about 2-3 % of the total WBCs.
→ Eosinophils resists infection and are also involved in with allergic reaction.

Agranulocytes

→ Lymphocytes and monocytes are the 2 types of agranulocytes

1) Monocytes → 6-8% of monocytes are present in the WBCs.
   → Monocytes are the phagocytic cells which destroy foreign organisms entering the body.

2) Lymphocytes → 20-25% of lymphocytes are present in the WBCs, which is of 2 types
   i) B Lymphocytes → produce antibody
   ii) T Lymphocytes → Help the B lymphocytes to produce antibodies.
   ↑HIV kr ke mein isko attack karta hai.

iii) Thrombocytes (Platelets)

→ Platelets also called Thrombocytes, are cell fragments produced from megakaryocytes (special cell in the bone marrow).

★ → Blood normally contains 1.5 - 3.5 lakh platelets mm^{-3}.

→ Platelets can release a variety of substances most of which are involved in the coagulation of clotting of blood.

→ A reduction in their number can lead to clotting disorder which will lead to excessive loss of blood from the body.

like breathing and keeping our heart beating

Blood vessels

→ Blood vessels are channels that carry blood throughout our body. They form a closed loop, like a circuit, that begans and ends at our heart.

→ Together the heart vessels, and blood vessels form our circulatory system. Our body contains about 60,000 miles of blood vessels.

→ There are 3 types of blood vessels :-

i) Arteries → It carry blood away from our heart.

ii) Veins → It carry blood back to our heart.

iii) Capillaries → It is the smallest blood vessels, connect arteries and veins.

Functions of blood vessels

→ The function of blood vessels is to deliver blood to the organs and tissues in our body. The blood supplies them with oxygen and nutrients they need to function.

→ Blood vessels also carry waste products and CO_2 away from our organs and tissues.

Arteries → Strong, muscular blood vessels carry oxygen-rich blood from your heart to your body.

→ Handle a large amount of force and pressure from your blood flow.

→ They don't carry large volume of blood.

→ At a time, 10-15% of your body's blood is in your arteries.

Arterioles → Arteries branch into smaller vessels called arterioles

→ Both arteries and arterioles are very flexible.

→ They get bigger or smaller to help maintain your blood pressure.

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Capillaries → This tiny blood vessels have thin walls.
→ Capillaries are where oxygen and nutrients are exchanged for CO_2 and waste.

Venules → Veins begin as tiny vessels called venules and get gradually larger as they near your heart.
→ Venules receive blood from capillaries.

Veins → They don't carry highly pressurized blood.
→ They had to carry large volume of deoxygenated blood back to heart.
→ Thin, less elastic walls help him to handle high volumes and low pressures.
→ Most veins have valves that open and close.
→ The ~~wa~~valves control blood flow and keep your blood flowing in one direction.
→ About 75% of your blood is in your veins.

Human circulatory System

→ Human circulatory system, also called the blood vascular system which consists of a muscular chamber heart, a network of closed branching blood vessels and blood, the fluid which is circulated.

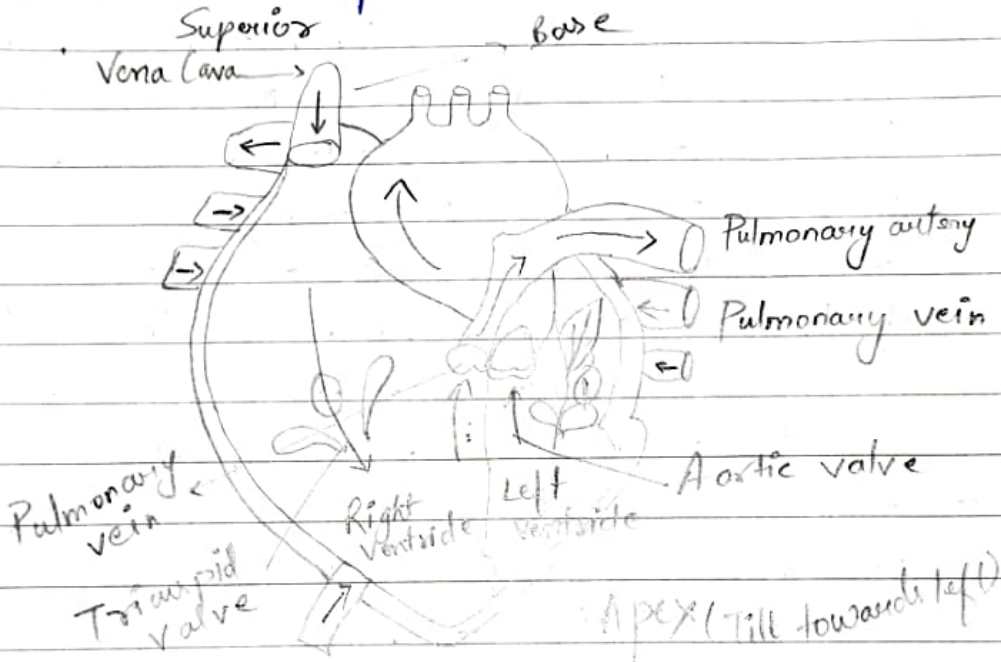
Anatomy of Heart

→ Heart is the mesodermally derived organ.
→ It is situated in the thoracic cavity in between two lungs. slitly tilt to the left.
→ It has the clenched fist.
→ It is protected by a double walled membranous bag called as pericardium.

→ CS → CFluid – Blood, lymph
Blood vessels – Arteries, Capillaries, Veins, Portal system
Pumping device – Heart

Dextrocardia

↳ Between the pericardium, pericardial fluid is present.
→ Our heart has four chambered two relatively small upper chamber artria and two lower chamber are larger called ventricle.
→ A thin muscular wall called the interatrial septum separate the right and left atrial. where as thick walled the inter ventricular septum seperate. the left and right ventrial.
→ The atrium and the ventricum of the same size is also separated by thick fibrous tissue cord the ~~cont~~ atrioventricular septum.



→ The opening of the right or left ventrical into the pulmonary artery and the aorta respectively are provided with the semilunar valves.
→ The valves in the heart allow the flow of blood in one direction that is from the atria to the ventricle and form the ventricle to the pulmonary artery or aorta.

→ Parasympathetic

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→ This valve present in that backward flow. the entire heart is made up of cardiac muscle. A specialised muculature called the nodal tissue is also distributed in the heart.

→ A patch of this tissue is present in the right atrium upper corner of the right ~~artery~~ called the SAN (sino aortial node).

→ Another mass of the tissue is seen in the lower left corner of the right atrium close to the artrial ventricular septum called the arterio ventricular node. (AVN).

→ A Bundle of nodal fibre (AV Bundle), atrioventricular bundle continue from the AVN which passes through the auriculoventricular septum emerge on the top of the inter venticular septum and immediately divided into a right and left bundle.

→ This branches give rise to minute fibre throughout the ventricular musculature of the respective side and are called as Purkinje fibres.

→ The opening b/w the right atrium and the right ventricle is guarded by a valve formed of 3 muscular flaps or cusps called as Tricuspid valve.

→ The opening b/w the left atrium and the left ventricle is guarded by a valve formed of 2 muscular flaps called as bicuspid valve or mitral valve.

→ The opening of the right and left ventricle into the pulmonary artery and the aorta respectively are provided with the semilunar valve.

→ The nodal musculature has the ability to generate action potential without any external stimuli. is

autoexcitable.

→ The SAN can generate the maximum no. of action potential is 72-75 beat/min and is responsible for initiating and maintaining the rhythmic contractile activity of the heart, therefore it is called pace maker.

Pericardium

The Pericardium is the fibrous ~~sac~~ state that surrounds the heart. It can be divided into 3 layers :-

i) Fibrous Pericardium
ii) Parietal Pericardium
iii) Visceral Pericardium

outer to inner → collagen fibre + simple squamous epithelial tissue

Pericardial fluid

Fibrous Pericardium

The fibrous pericardium is a layer of connective tissue that provide support and protection for the heart.

→ It is a number of attachment to the diaphragm in the sternum and the vertibral column It holds the heart in place.

NOTE - The parietal and visceral pericardium together fuse to form serous pericardium.

→ The Inner (visceral) layer of the serous pericardium by the outer surface of the heart. B/w the two layer of serous pericardium cavity which contain pericardial fluid.

→ It is the fluid that provide lubrication b/w the two layer and allow the heart to expand and contract.

Walls of Heart

The walls of the heart are composed of three layers.

1) Epicardium (outer layer)
2) Myocardium (middle layer)
3) Endocardium (Inner layer)

Epicardium → The epicardium is continous with the visceral layer of the serous periatal pericardium. Between the epicardium and the myocardium are the coronary blood vessel. The vessel are usually surrounded by fat.

Myocardium → The myocardium is the muscle of the heart it is involuntary striated cardiac muscle. made up of whole network of dividing and recombining fibres.

→ This is the part of the heart that allows for contraction the amount of myocardium is different for each of the chambers depending on the amount of force needed in the contraction. The myocardium contains a large no. of mitochondria providing energy for mitochondria providing energy for the heart muscles.

Endocardium layer → The endocardium from the inner lining of the heart and the flaps from the valves of the heart.

Heart valves

→ Heart valves are parts of our heart that act like doors.
→ They open and close to let blood flow from one area of our heart to another.
→ They help to ensure that blood moves at the right time and in the correct direction.
→ As the valves open and close, they create two sounds, which are our heart beat. ie lub dub.
→ The 4 valves of the heart are :-
  i) Aortic valve
  ii) Mitral valve
  iii) Pulmonary valve / Pulmonic valve
  iv) Tricuspid valve

i) **Aortic valve** → This valve has three leaflets.
  → They open to let blood flow from your heart's left ventricle to the aorta.
  → The aorta is the largest blood vessel in your body.
  → It brings oxygenated blood from your heart to the rest of your body.
  → The aortic valve prevents backward flow from the aorta into the left ventricle.

ii) **Mitral valve** → This valve has two leaflets.
  → They allow blood to flow from the lung ~~to it~~ into the left atrium.
  → And they prevent backward flow from the left ventricle to the left atrium.

iii) Pulmonary valve → This valve also has three leaflets. They & allow blood to pump from the RV to the Pulmonary artery.
→ This artery leads to the lungs, where blood picks up oxygen.
→ The pulmonary valve prevents blood from going backward from the pulmonary artery to the R.V.

iv) Tricuspid valve → This valve has three leaflets.
→ They allow blood to flow from the RA to the RV.
→ They also prevent blood from flowing backward from the RV to the RA.

Function of the valves

(i) → The valves open and close to help blood move along its path.

The valves prevent the backward flow of blood.

ii) The mitral and the tricuspid valve moves blood from the upper chambers of the heart to the lower chambers of the heart only in one direction.

iii) The aortic and pulmonary valves move blood to the lungs and the rest of the body through the ventricles.

Coronary arteries

→ Coronary arteries supply blood to the heart muscles.
→ There are two primary coronary arteries.

i) Right coronary arteries (RCA)
The RCA emerges from the anterior ascending aorta and supply blood primary to the right artrium and right ventrical.

ii) Left main coronary artery (LMCA)
The left ~~anter~~ interior decreasing arteries branches of the left coronary arteries and supply blood to the front of the left side.

Nerve and blood supply

The heart is supplied by 2 coronary arteries :-

① LMCA
→ LMCA carries 80% of the fluid to the heart muscles.
→ It is a short arteries that divide into 2 branches.

a) Left anterior descending artery
That supply anterior 2/3 of the interventricular septum and adjoining part of the left ventricle interior wall.

b) Circumflex coronary arteries
That supply blood to the lateral and portal portion of the left ventricle.

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② RCA

It supply the blood to the right atrium (RA), right ventrical (RV) and left ventrical interior wall.

Blood group

→ Various type of grouping of blood group has been done. To such grouping are

i) ABO blood grouping and
ii) Rh blood grouping are widely use all over the world.

(i) **ABO grouping** - ABO grouping is based on the presence or absence of two surface antigen on the RBCs namely A and B.

Antigen

An antigen is a foreign substance that enter in our body this can include bacteria, virus, fungi allergens and other various toxic.

OR

An antigen is a chemical that can include immune response against the foreign substance.

Antibody - An antibody is a protein by our immune system to attack and fight off against these antigen.

→ Similarly, the plasma of different individual contain two natural antibodies (proteins produce in response to antigen).

→ This distribution of antigen and antibodies in the 4 group of blood A, B, AB and O.

→ During blood transfusion any blood cannot be used; the blood of a donor has to be carefully matched with the blood of a receipient before any blood transfusion to avoid severe problem of clumping.

→ Blood group and Donor compability.

Blood group	Antigen RBC	Antibodies in plasma	Donors group
A	A	B	A.O
B	B	A	B.O
AB	A.B	Nil	AB, A, B, O
O	Nil	A.B	O

→ From the above mentioned table, it is evident that group 'O' blood can be donated to person with any other blood group and hence 'O' group individual are called 'universal donors'.

→ A person with 'AB' group can accept blood from persons with A B as well as the the other groups of blood. Therefore, such person are called universal recipients.

→

ii) The ABO System

There are 4 main blood groups defined by the ABO system :-

Blood group A - Has A antigens on the red blood cells with anti-B antibodies in the plasma.

Blood group B - Has B antigen with Anti A antibodies in the plasma.

Blood group O - Has no antigens but both anti A and anti B antibodies in the plasma.

Blood group AB - Has both A and B antigens, but no antibodies.

Rh Grouping

Ii blood group system

Ii - Ii blood group system classification of human based on the presence of antigen Ii on the surface of RBC.

→ The Ii blood group system is associated with cold antibodies (antibodies that function only at temp below normal body heat) and several blood disease.
→ I antigen is found in the cell membrane of RBC in all adult whereas the i antigen is found in the only on RBC of developing foetus and new born infant.
→ In new born infant the i antigen undergoes gradual conversation to reach adult level of the I antigen with 18 month of birth.

Diego Blood Group System

→ Diego blood group system classified of human blood according to the properties confirmed by the presence of an antigen designated Di there are 21 none diego antigens.
→ The determination of diego blood group system is based on the antigens denoted Di^a and Di^b.

Rh Blood group

→ It was first detected in Rhesus monkey.
→ Sometimes surface antigens of RBCs have the Rh factor.
→ 97% Indian population have Rh positive (i.e. presence of Rh antigens) also else have Rh negative blood group.
→ Generally, no anti-Rh antibodies are found in blood plasma.
→ Production of anti-Rh antibodies occurs by the immune system when an Rh^- person receives blood having Rh^+ antigens.
→ These anti-Rh antibodies remain in the blood and when second transfusion of Rh^+ blood is given, These antibodies agglutinate causing haemolysis of the donated RBCs and a severe reaction.

Conception of Rh^+ foetus by Rh^- mother :-

→ The Rh factor suported prior to marriage is important because Rh incompatibility could occur during pregnancy.

→ This incompatibility ~~co~~results in erythroblastosis foetalis which causes foetal death in the womb.

Rh System

→ RBC sometimes have another antigen a protein k/s as the RhD antigen.

→ If this is present your blood group is RhD positive. If it is absent your blood group is RhD negative.

This means you can be 1 of 8 blood groups :

- A RhD positive (A^+)
- A RhD negative (A^-)
- B RhD positive (B^+)
- B RhD negative (B^-)
- O RhD positive (O^+)
- O RhD negative (O^-)
- AB RhD positive (AB^+)
- AB RhD negative (AB^-)

→ About 85% of the UK population is RhD positive (36% of the population has O^+; the most common type).

→ In most cases, O RhD negative blood (O^-) can safely be given to anyone. It is often used in medical emergencies when the blood type is not

immediately known.

→ It is safe for most recipient because it does not have any A, B or Rh D antigen on the surface of the cell and is compatible with every other ABO and Rh D blood group.

Erythroblastosis Foetalis

→ Rh group should also be matched before transfusions, a special case of Rh incompatibility (mismatching) has been observed b/w the Rh-ve blood of a pregnant mother with $Rh^{+}ve$ blood of the foetus.

→ Rh antigens of the foetus do not get exposed to the Rh-ve blood of the mother in the first pregnancy as the two bloods are well seperated by the placenta.

→ However during the delivery of the first child, there is a possibility of exposure of the maternal blood to small amount of the Rh+ve blood from the foetus.

→ In such cases, the mother starts preparing antibodies against Rh antigen in her blood.

→ In case of her subsequent pregnancies the Rh antibodies from the mother (Rh-ve) can leak into the blood of the foetus (Rh+ve) and destroy the foetal RBCs.

→ This could be fatal to the foetus or could cause severe anaemia and jaundice to the baby. This condition is called erythroblastosis foetalis.

→ This can be avoided by administering anti Rh antibodies to the mother immediately after the delivery of the first child.

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Uses/Significance of Blood groups

i) For transfusion of blood
ii) To prevent erythroblastosis foetalis.
iii) To determine various disease.
iv) Use in DNA finger printing to identify criminals
v) paternity dispute.
vi) Haemolytic disease of new born baby.
vii) Immunology genetics anthropology.

Nerve supply

→ The main control of the heart resides with the medulla oblangata.
→ There is an area called the cardio ~~exc~~accelerator centre or processor centre in the upper part of the medulla oblangata and an area called the cardio inhibitory centre or depression centre in the lower part.
→ The nervous supply to the heart is autonomic, consisting of both sympathetic and parasympathetic parts.

Sympathetic

→ The sympathetic fibres arise from the pressor centre
→ The sympathetic nervous system acts on the sino antrial node, speeding up the depolarisation rate and therefore increasing the heart rate.

Parasympathetic

→ The parasympathetic fibres arise in the depressor centre
→ The parasympathetic nervous system works in reverse in order to slow the heart rate down.

1 min = 72 time Heart beat
0.8 s → 70 ml blood → stroke volume
1 min = 5400 ml → 5 l of blood → cardiac output

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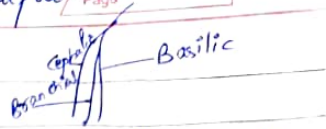
Veins used for IV injections



→ The basilic and cephalic veins are good alternatives for stabilising IV axis.
→ The brachial vein can be considered, but caution must be used due to its location near the brachial artery in the antecubital fossa.
→ NOTE - Blood donation is most often performed by inserting a large bold needle (16G or 18G) into a peripheral vein, usually within the antecubital fossa.

Applied physiology

Cardiac cycle

→ At the beginning of four chamber of heart are in relax stage that is they are in join in diastole.
→ As the tricuspid and bicuspid valve are open blood from the pulmonary vein and venacava flow into the left and the right ventricle respectively through the left and right artria. The semilunar valve are closed at this state.
→ The SAN now generate and action potential which stimulate both the atria to a undergone the stimultaneously contraction that is the atria systole.
→ This increase the flow of blood into the ventricles by about 30%.
→ The action potential is conducted to the ventricular side by the AVN and the A.V bundle from where the bundle of his transmit it through the entire ventricular musculature.
→ This causes the ventricular muscle to contract (ventricular systole) the atria undergoes relaxation (diastole).

ECG (Electro cardio gram)

→ ECG is a graphical representation of the electrical activity of the heart during a cardiac cycle.

→ A patient is hooked up to a monitoring machine that show voltage traces on a screen and makes the sound 'P' 'P' 'P' as the patient goes into cardiac arrest.

→ This type of machine is called electro cardio graph and the graphical representation is use to obtain and electro cardio gram.

→ To obtain a standard ECG a patient is connected to the machine with three electrical leads (1-2 each wrist and to the left ankle) that continously monitor the heart activity.

→ To detect evaluation of the heart function multiple leads are attached to the chest region.

→ Each peak in the ECG is identified with a letter from P to T that is response to a specific electrical activity of the heart.

→ The P wave represents the electrical excitation (depolarization) of the atria. which leads to the contraction of both the atria and QRS complexes represence the depolarization of the ventricle which

initiate the ventricle contract
→ The contract start shortly after Q and marks the beginning of the systole.
→ The P wave represence the return of the ventricle from excited to normal state (repolarization) the end of the T waves marks the end of systole.
→ By counting the number of QRS complexes that occur in a given time period one can determine the heart beat rate of an individual.

Double Circulation

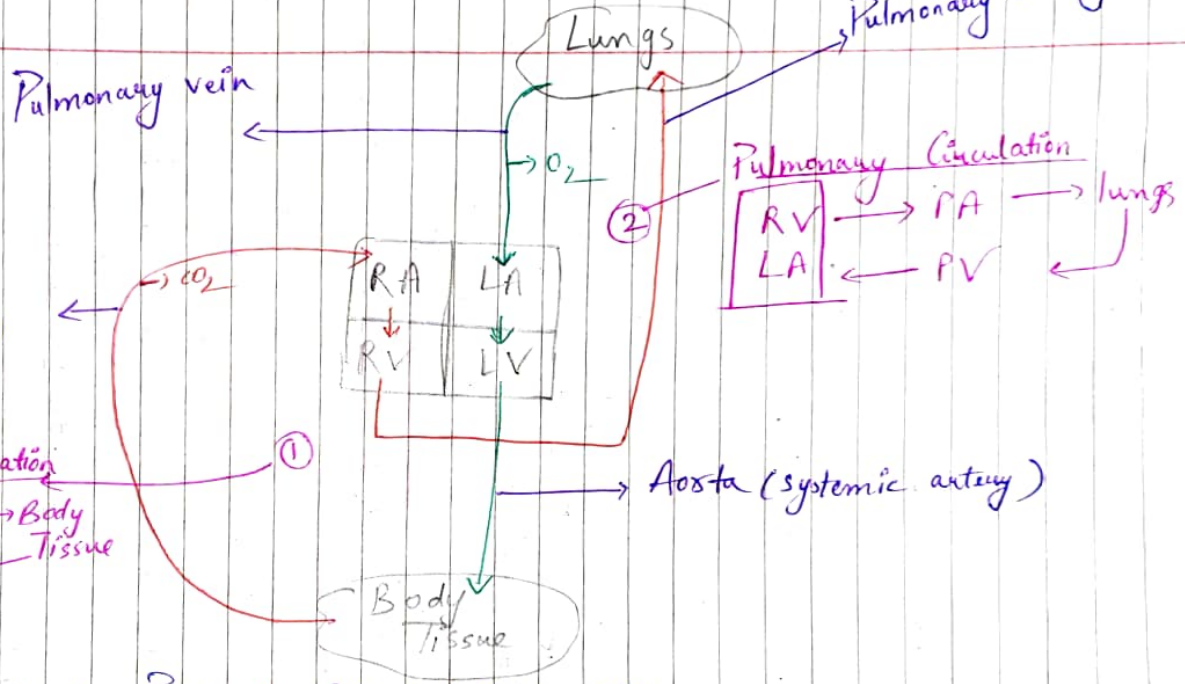
→ The blood flow strictly by a fixed route through blood vessels – the arteries and veins.
Basically each arteries and vein consist of three layers-

① An inner lining of squamous endothilium called as tunica intima
② A middle layer of smooth muscle and elastic fibre called as tunica media.
③ An external layer of fibrous connective tissue with collagen fibre called as tunica externa.

NOTE - The tunica media is comparatively thin in the vein.
A unique vascular connection exist b/w the digestive tract and liver called hepatic portal system.
The hepatic portal vein carry blood from intestine to the liver before it is delivered to the systemic circulation.

→ A special coronary system of blood vessel is present in our body exclusively for the circulation of blood to and from the cardiac musculature.

Artery – oxy
Vein – deoxy



Systemic Heart – Pump only oxy. blood (LA + LV)
Pulmonary Heart → Pump only deoxy. " (RA + RV)

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Stroke Volume

→ The heart beats 72 times/min. ie, that many cardiac cycles are performed per minute. Duration of one cardiac cycle is 0.8 sec.

→ During a cardiac cycle, each ventricles pumps out approximately 70 ml of blood which is called the stroke volume.

Cardiac Output

→ The stroke volume multiplied by the heart rate (no. of beats per minute) gives the cardiac output 5040 ml approximately 5 l.

$= 70 \times 72 = 5040 ml = 5 l$

∴ The cardiac output can be defined as the volume of blood pumped out by each ventricle per minute and average 5000 ml or 5 l in a healthy individual.

Pulmonary circulation

→ The blood pumped by the RV enters the Pulmonary Artery whereas the LV pumps blood into the Aorta.

→ The deoxygenated blood formed into the PA is passed on to the lungs from where the oxygenated blood is carried by PV into the left atrium. This pathway constitutes the pulmonary circulation.

Systemic Circulation

→ The oxygenated blood entering the aorta is carried by a network of arteries, arterioles and capillaries to the tissues, from where the deoxygenated blood is collected by a system of venules, vein and vena cava which

is empty into the right atrium. This is the systemic circulation.

→ A systemic circulation provides nutrients, O_2 and other essential substance to the tissue and takes CO_2 and other harmful substances away for elimination.

Applied Physiology

i) ANGINA

It is also called as angina pectoris and sometimes called as ischemic chest pain.

→ A symptoms of a quack chest pain appears when no enough oxygen is reaching to the heart muscles.

→ Angina is a type of chest pain caused by reduce blood flow to the heart. It is a symptom of coronary arteries disease.

→ Angina can occur in man and women of any age but it is more common ant the middle age and elder age.

Symptoms

① Squeezing
② Pressure
③ Heaviness
④ Tightness and pain in the chest.

People Make Experience

i) Pain Area – chest, neck or jaw.
ii) Gastrointestinal – Heart burn, indigestion, Nausia
iii) Respiratory – Shortness of breathing or rapid breathing

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Treatment

i) Self care - Physical exercise, weight loss, quitting smoking.
2) Medication - Antionginal, Beta blocker Antihypertensive drug, Calcium channel blocker and Anticoagulant.
3) Medical Procedure - Coronary angioplastic, coronary stent, Cardiac catheterization, Revascularization.
4) Therapy - Cardiac rehabilitation
5) Surgery - Coronary artery by pass surgery and Hybrid coronary revascularization.

ii) HEART ATTACK

→ Heart attack is also called as myocardium infraction or
→ A heart attack is a medical emergency which occurs when a blood clot blocks blood flow to the heart due to this blood tissue losses oxygen and they are died.
→ When the heart muscle is suddenly damage by an inadequate blood supply.

Symptoms

→ Tightness or pain in the chest, neck, back or arms.
→ Abnormal heart beat anxiety.

People make experience

i) GIT - Heartburn, Indigestion and Nausia and Vomiting.
Neck - ~~This com~~ Discomfort or tightness.
Arm - Discomfort and tightness.
ii) Whole body - Cold sweat, dizziness, sweating

Treatment

i) Medication – Anticoagulant drug, B blacker drug, ACE inhibitor drug, Narcotic drug.

2) Medical Procedure - Coronary stent and coronary angioplasty.

3) Self care – walking, swimming, yoga.

ii) CONGESTIVE HEART FAILURE (CHF)

→ A chronic condition in which the heart doesn't pump blood as well as it should.

→ Heart failure can occurs if the heart cannot pump (systolic) or fill (diastolic) adequately.

Symptoms

1. Shortness of breath
2. Fatigue, swollen legs and rapid heartbeat

People Make experience

i) Pain area – in the chest

2) Whole body - dizziness, fatigue, inability to exercise or loss of appetite.

3) Respiratory - Fast breathing shortness of breath at night. Shortness of breath on exercise or shortness of breath on lying down.

4) GIT - Water retention or bloating.

Treatment

1. Self care - Physical exercise quitting smoking, weight loss and low sodium diet.

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④ Medications - Diuretic Beta blocker, ACE inhibitors. Antihypertensive drug. Dietary supplement blood pressure support
⑤. Medical Procedure - Cardiac resynchronization therapy.
⑥ Devices - Implantable cardioverter defibrillators.
⑦ Surgery - Coronary artery bypass surgery.

iv) HIGH BLOOD PRESSURE

→ A condition in which the force of the blood against the artery wall is too high.
→ Usually hypertension is defined as blood pressure above 140/90 and is considered severe if the pressure is above 180/120.

Symptoms

→ High blood pressure often has no symptoms over time. If untreated it can cause health conditions such as heart disease and stroke.

Treatment

Eating a healthier diet with less salt, exercising regularly and taking medication can help lower blood pressure.

1) Self care - Physical exercise, stress management, quitting smoking, home blood pressure monitors and low sodium diet.
ii) Medication - ACE inhibitors, Diuretic Beta blocker, Anti-hypertensive drug, calcium channel blocker and vasodilators
∴ ACE - Angiotensin - coverting enzyme.

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v) ATHEROSCLEROSIS

→ Also called atherosclerotic cardiovascular disease. The build up of fats, cholestrol and other substance in and on the artery walls.

→ A build up of cholestrol plaque in the walls of ~~arter~~ arteries, causing obstruction of blood flow.

→ Plaque may rupture, causing acute conclusion of the artery by clot.

Symptoms

→ Atherosclerosis often has no symptoms until a plaque ruptures or the build up is severe enough to block blood flow.

People may experience

→ Pain circumstances - Can occur in the leg while exercising.
Also common - erectile dysfunction.

→ Heart attack ministrokes (transient ischaemic attacks) poor wound healing & stroke.

Treatment

i) Self care - Heart healthy diet supervised exercise program and weight loss.

ii) Medication - Statin, Anticoagulant and cholesterol medication.

iii) Medical procedure Coronary stent and Angioplasty.