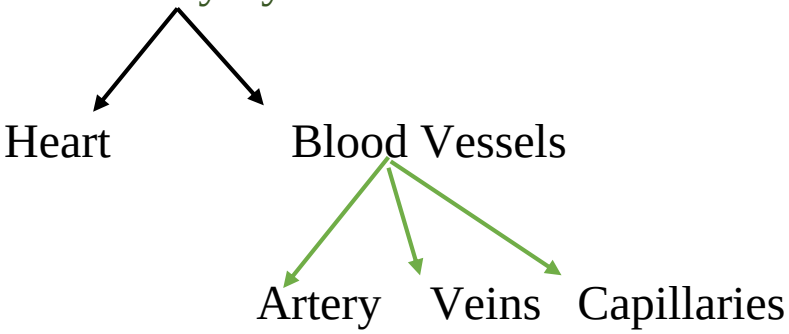
THE HEART

Circulatory System:



Heart:

→Definition: It's a hallow muscle known as myocardium.
→Function: pumps and pushes blood through blood vessels to all body organs, tissues and cells.
→The activity of the heart is known as Cardiac Activity.
→Made up of: it has 4 chambers (Cavities) which receive blood to pump it again to all body organs.

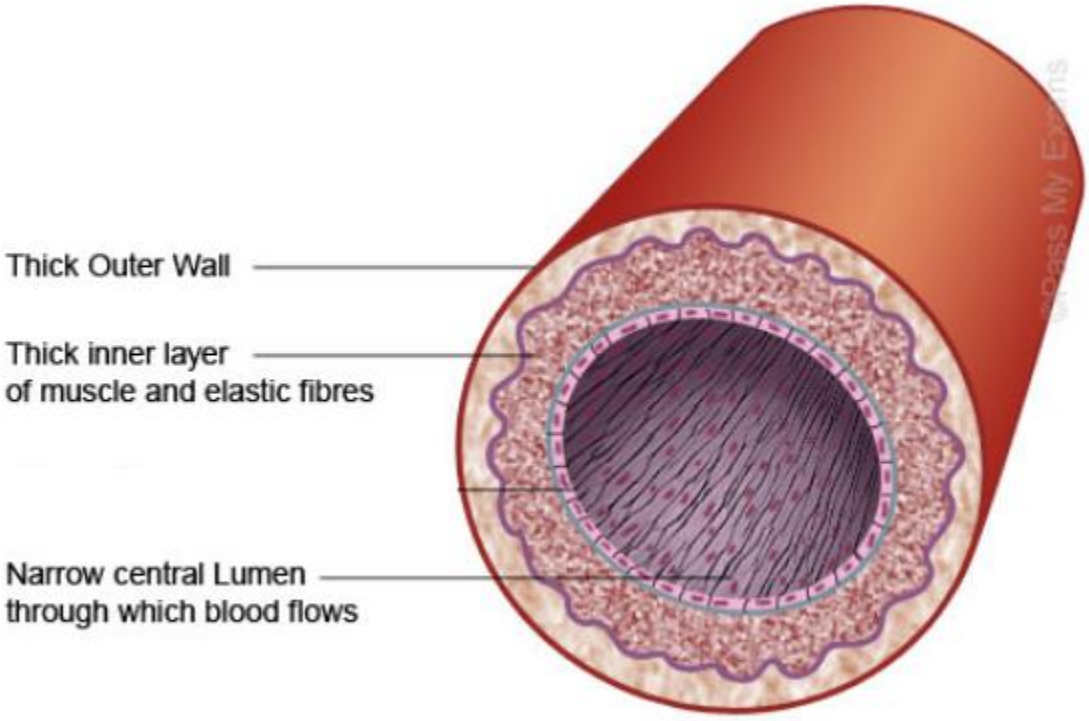
NOTE:

→The heart is surrounded by a very thin membrane for its protection.
→Known as Pericardium.

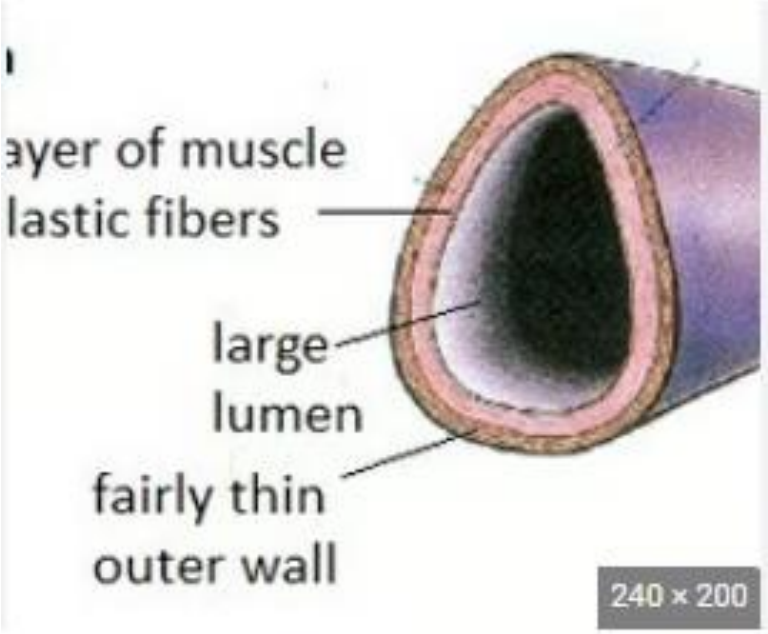
Diagram of a heart:

Title: Schematic diagram illustrating the structure of the heart.

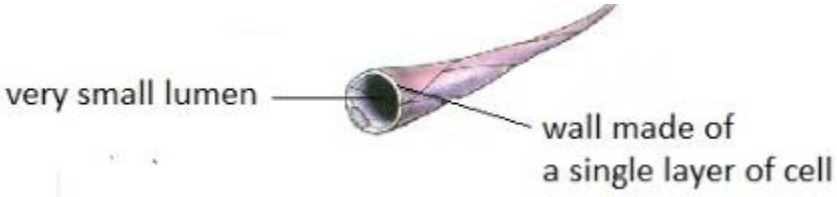
Blood Vessels:



Artery



Vein



Capillaries

Arteries: (A: away)

→Carry blood away from the heart.
→The aorta carries blood rich in oxygen (O_2) from Left ventricle to all body parts.
→Arteries carry blood rich in oxygen (O_2) except pulmonary artery.
→Pulmonary artery has a valve known as sigmoid valve.
→Sigmoid valve: prevent the back flow of blood to the right ventricle.

Veins:

→Carry blood back to the heart.
→Superior and inferior vena cavas carry blood rich in carbon dioxide (CO_2) from all body part to the right auricle.
→Veins carry blood rich in CO_2 except pulmonary vein.
→Pulmonary veins carry blood rich in O_2 from the lungs to the left auricle.

Capillaries:

→They are very thin vessels at which exchange of gases and nutrients takes place.
→Blood circulates very slowly inside them.

Action f Cardiac activity:

→Left auricle receives blood rich in O_2 from the lungs through pulmonary veins.
→Right auricle receives blood rich in CO_2 from all body cells through superior and inferior vena cavas.
→Both auricles contract together to push the blood into ventricles.

Left auricle → to → left ventricle

Right auricle → to → right ventricle

→Blood rich in O_2 reaches left ventricle where its pushed from the left ventricle.

Left ventricle → to → all body parts (through aorta)

→Blood rich in CO_2 reaches right ventricle where it's pumped from right ventricle.

Right ventricle → to Lungs (through pulmonary artery)

Role of Valves:

→Allow blood to move in one direction from auricles to ventricles.
→Allow blood to pass from ventricles to arteries (when opened).
→They close to prevent the back flow of blood into ventricles.

NOTES:

Heart beat:

→Contraction and relaxation of the muscle of the heart (Myocardium)
→It's rhythmic.
→Heart makes 70-75 heart beats/minute.

Cardiac cycle	Characteristics
1. Auricular systole (0.1 seconds)	✓ Auricles contract together at the same time to push blood from auricles to ventricles. ✓ Tricuspid and bicuspid valves are open to allow the flow of blood from auricles to ventricles.
2. Ventricular systole (0.3 seconds)	✓ Ventricles contract simultaneously to push blood from right ventricle to pulmonary artery and fro, left ventricle to aorta.
3. General diastole (0.4 seconds)	✓ Auricles and ventricles are relaxed. ✓ Blood fills the auricle slowly. ✓ Bicuspid and tricuspid valves are closed.

REMARK!!!

→ A.S + V.S + G.D
= 0.1 + 0.3 + 0.4
= 0.8 seconds
→ Duration of cardiac cycle

→ A.S + V.S
= 0.1 + 0.3
= 0.4 seconds.
→ Duration of systole (contraction)

→G.D= 0.4 seconds. → Duration of diastole (relaxation)

NOTE:

Why the muscle of the heart never gets fatigue?

muscle of the heart never gets fatigue because the duration of the contraction which is 0.4 seconds is equal to the duration of the relaxation which is also 0.4 seconds. Thus, it contracts as much as it relaxes.

Electrocardiogram (E.C.G):

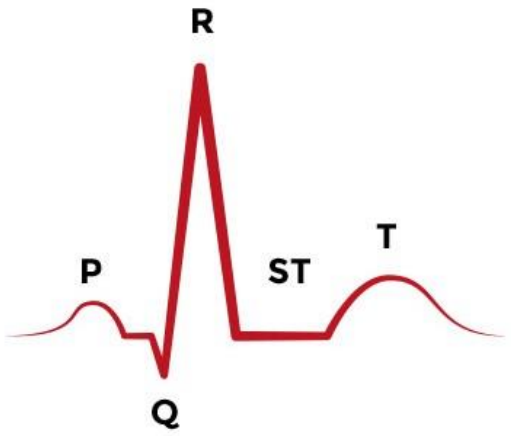
→Definition: Recording of the electric activity generated by the heart during contraction and relaxation.

→Purpose: the study of E.C.G can help doctors to determine if there is any abnormality on the function of the heart such as:

- ✓Irregular heartbeats.
- ✓Irregular cardiac activity.

Which is caused by a heart disease.

Title: graph showing a normal E.C.G.



NOTE:

If there is irregularity in the activity of the heart, the blood won’t pump normally throughout the blood.