

Cardiovascular System الجهاز القلبي الوعائي

Heart : General characterizations :

- 1 – The heart is a complex organ that pumps blood through the body by blood vessels , blood reach to all organs except cartilage , eye lens , brain and skin (epidermis) .
- 2 – Heart have four chambers(two atria and two ventricles) , valves .
- 3 – It has own circulation system by coronary artery .
- 4 – It receives electric impulse that make it contract and relax , forming the cardiac cycle .
- 5 – Heart is enclosed in a sac called pericardium .
- 6 – Layers of heart wall (Epicardium , myocardium , endocardium) .

Movement of blood in the heart :

- 1 – The right atrium (RA) receive deoxygenated blood from the head , neck and other part of the body via superior and inferior vena cava .
- 2 – Blood pass from right atrium to the right ventricle via tricuspid valve .
- 3 – Right ventricle then pumps blood to the lungs through the pulmonary artery .
- 4 – The oxygenated blood is returned to the left atrium (LA) via the pulmonary veins .

5 – The blood pass from LA to the left ventricle (LV) through mitral valve (bicuspid valve) .

6 – Heart pumps blood from LV to the whole body through Aorta .

Cardiac Valves :

1 – Mitral valve (bicuspid) located between left atrium and left ventricle .

2 – Tricuspid valve located between right atrium and right ventricle .

3 – Pulmonary valve located between right ventricle and pulmonary artery .

4 - Aortic valve located between left ventricle and aorta .

Functions of heart valves :

1 - When the heart muscle contract and relax the valves are opened and shut letting blood flow pass .

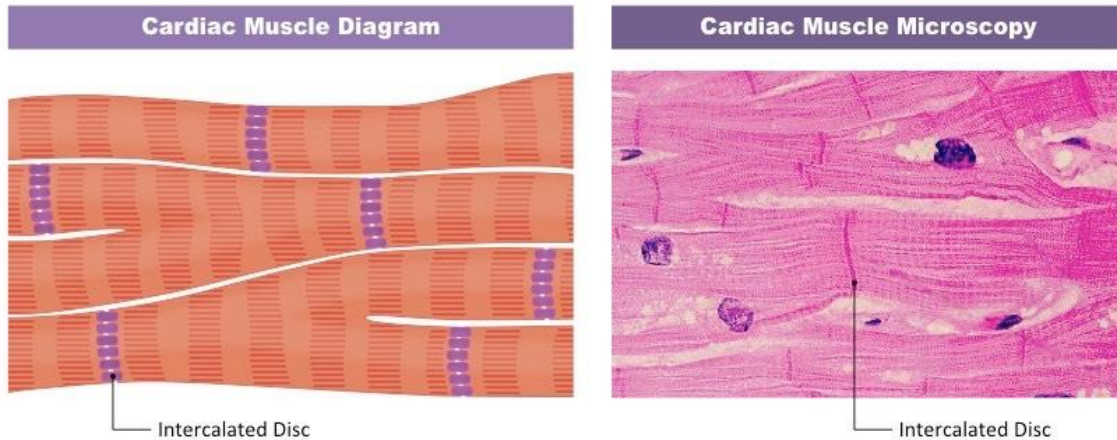
2 – When the valves are shut prevent blood flow backwards .

Cardiac Muscle :

1 – Cardiac Muscle , involuntary muscle .

2 – Striated 3 - Cardiac muscle fibers are branched .

4 – Cardiac muscle cells have intercalated disc .



Conducting System and Heart Rhythm

Cardiac muscle involuntary muscle has ability to the contraction of the muscle cells .

- 1 – In the heart electrical changes needed to generate a cardiac impulse which starts with a specialized area of (Sinoatrial node SAN) situated in the right atrium) .**
- 2 – SAN is a natural pacemakers , when working properly initiate impulses and stimulate cardiac contraction .**
- 3 – The cardiac impulse passes from the SAN into atria which start to contract and transmitted to another specialized cells the atrioventricular node AVN .**
- 4 – AVN is situated in the inter-atrial septum (between RA and LA) provided a pathway of conduction between atria and ventricles .**
- 5 – The impulse then travels down into a large bundle of specialized tissue (bundle of His) which conducts it down the ventricles .**
- 6 – Bundle of His spilt into the right and left bundles in the interventricular septum .**

7 - Purkinje fibers are a continuation to bundle of His , start before looping upwards and travelling in the lateral aspects of the RV and LV .

ECG (electrocardiogram) : It is special technique used to know normal and abnormal heart rate (rhythm or arrhythmias) , using electrodes placed on the skin .

Tachycardia ; Fast heart beat

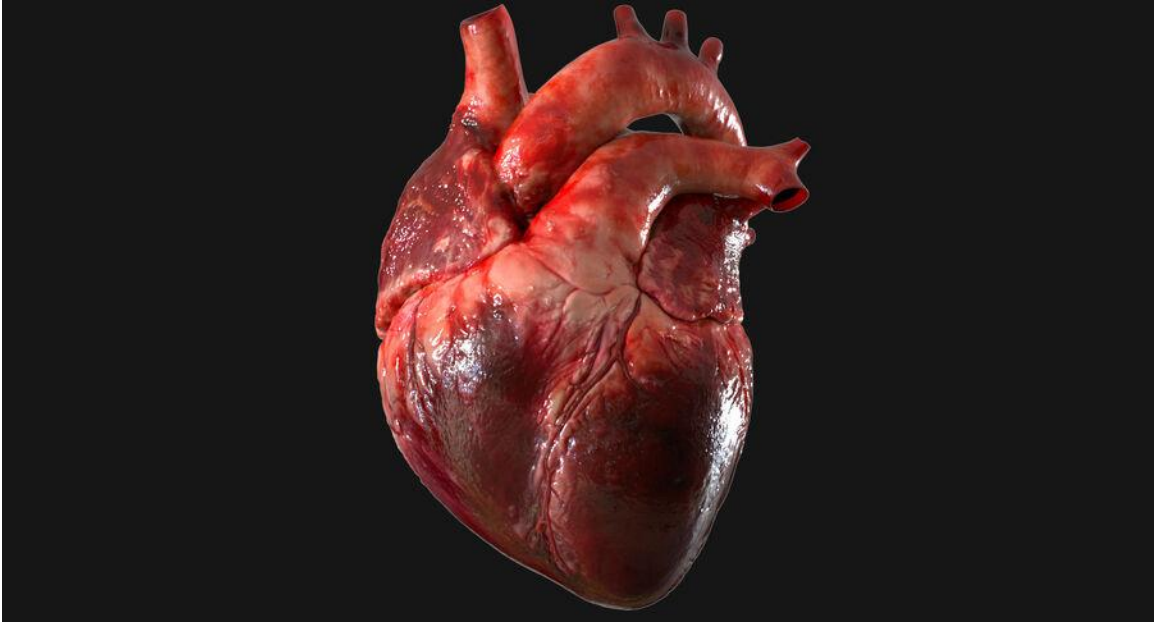
Bradycardia : slow heart beat

Chest pain due to Angina pectoris

Atrial fibrillation .



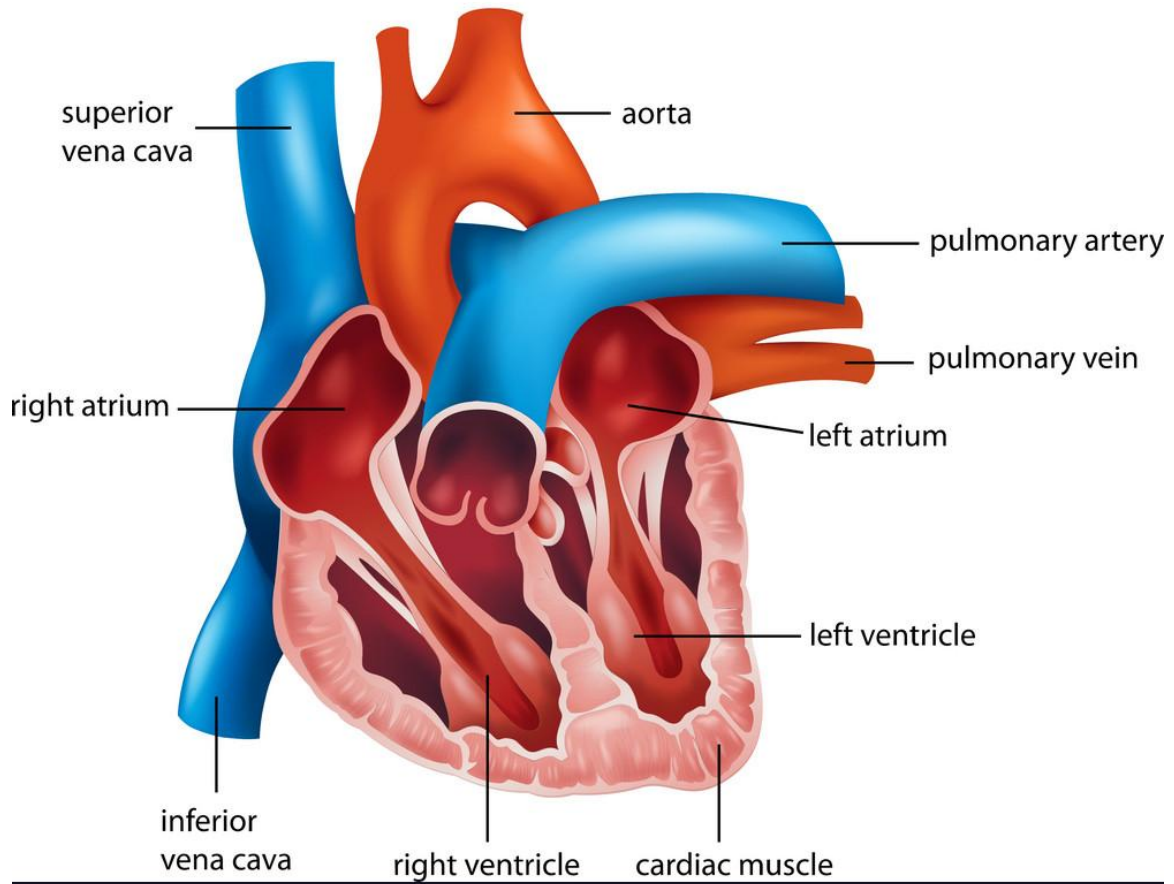
Electrodes of ECG technique to know heart rate ?



Heart of human / blood vessels left vena cava , middle aorta , right pulmonary artery .

**Coronary thrombosis (blood clot) inside blood vessels .
Infarction of heart : Blood flow decreases or stop cause necrosis in heart muscle .**

Anatomy of the Human Heart



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Last picture : Conducting system / Electricity of heart



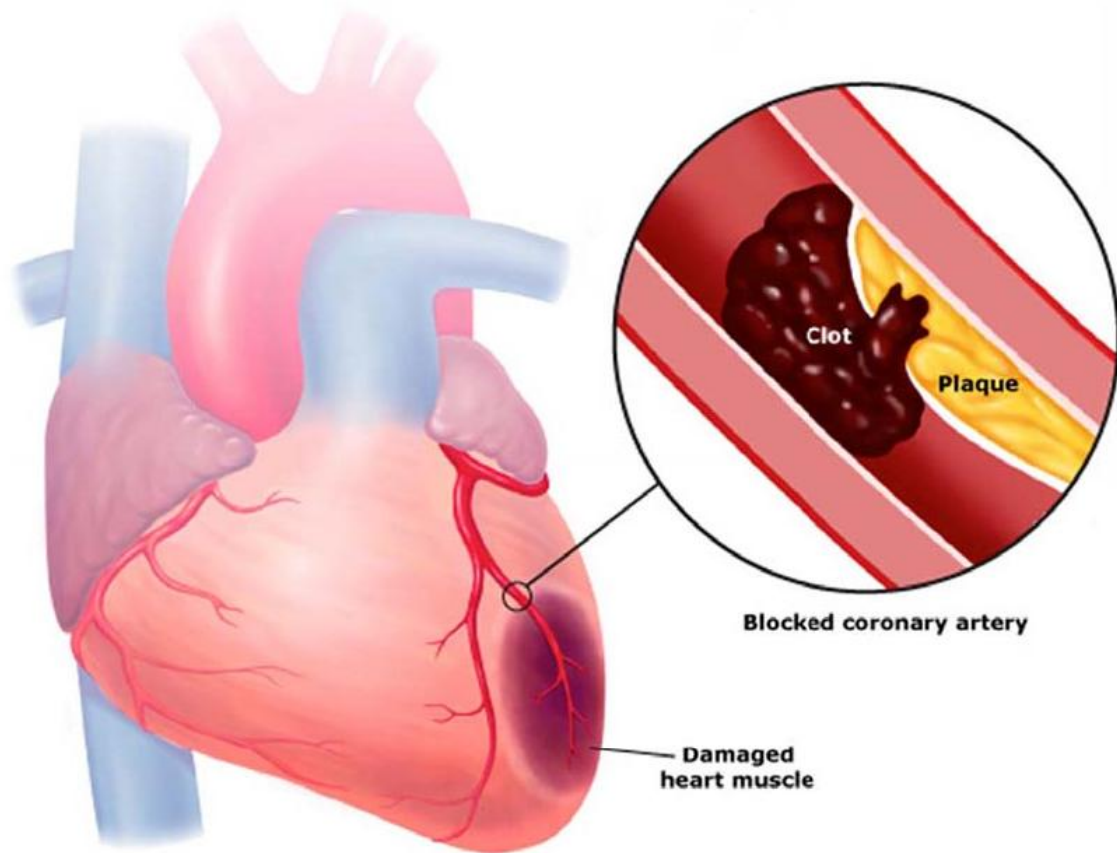


Figure 2 Atherosclerotic plaque rupture leading to blood clot formation and a blocked

