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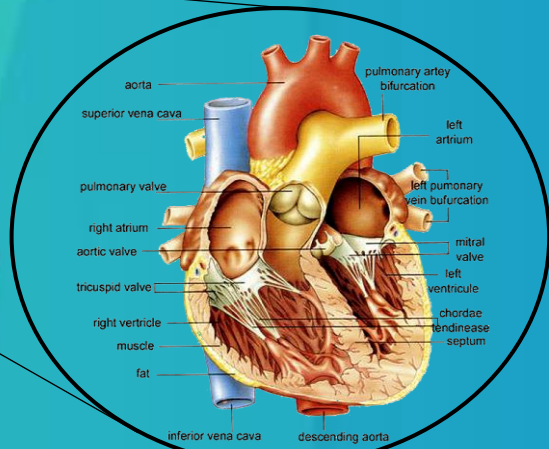
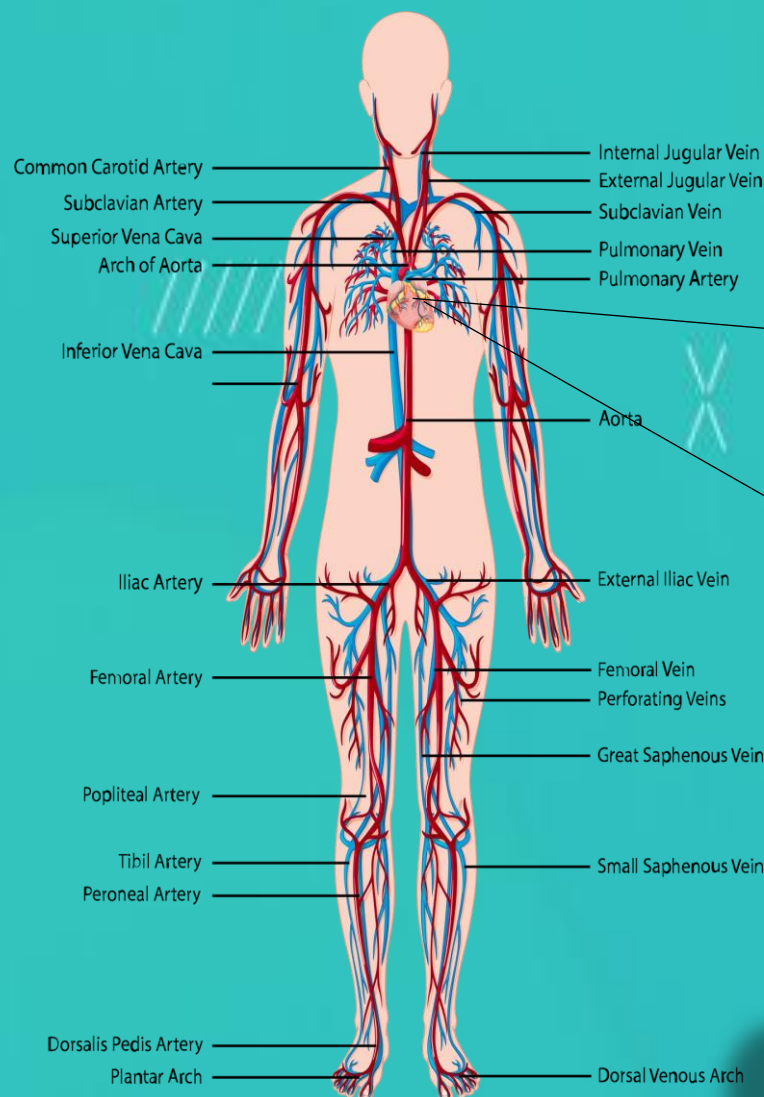
STUDENT ID NO:1807092

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MODULE: introduction to Physiology

SUBMITTED TO:MUMTAZ GOOLAM

CARDIOVASCULAR SYSTEM



HEART

Introduction:

The Cardiovascular System includes the heart and blood vessels. It deliver blood to all parts of the body. The heart beat at a rate of 60 to 100 beat per minute. The heart is located in the center of the chest and at the and at the back of sternum. The heart is a cone shaped. It is composed of four chamber .the upper two chambers are called the left and right atria and the lower two chambers are called the left and right ventricles. Together the right atrium and right ventricle from the right heart and left atrium and left ventricle form the left heart. The right atria and ventricles are separated from the left atria and ventricle by a solid structure called septum.

Structure and function of Heart:

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The four chambers of the heart organized into two pumps right and left to deliver blood to the systematic and pulmonary circulation. Right atrium collects deoxygenated blood from the whole body through superior and inferior vena cava except lungs. Therefore the atrium act as a reservoir to receive deoxygenated blood from the right atrium blood flows via the tricuspid valve to fill the right ventricle. The right ventricle pump blood into the pulmonary artery that carries blood to the lungs for oxygenation. In the lungs the blood take oxygen as it pass through the capillaries. The pulmonary vein collect the oxygenated blood and carries it to the left atrium that act as a reservoir for oxygenated blood. The blood pass from the left atrium into the left ventricle. The left ventricle then pumps and sending oxygenated blood into the entire body (systemic circulation).in the next heartbeat the cycle is repeated all over again.

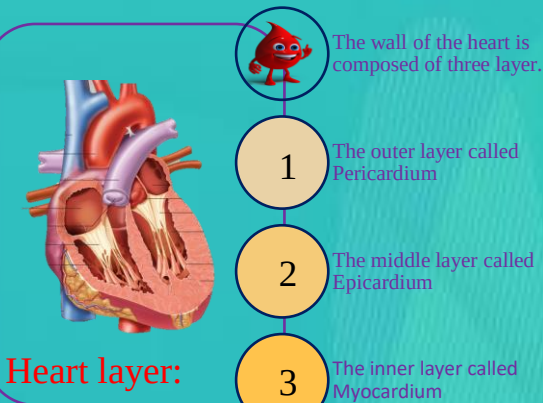
Heart valves:

Pulmonary valve: At entrance to pulmonary trunk, prevent backward blood flow from pulmonary trunk to right ventricle.

Mitral valve: located between left atrium and left ventricle it prevent backward flow of blood from left ventricle to left atrium.

Aortic valve: At entrance to aorta, prevent backward flow of blood from aorta.

Tricuspid valve: It is located between atrium and right ventricle it prevent backward flow of blood from right ventricles to right atrium.



Blood Vessels:

Blood vessels are a channel that carry blood throughout our body.

Arteries: Arteries is that blood vessels which carry the blood away from the heart. They are large ,thick-walled arteries. The arteries wall contain a thick layer of smooth muscle that can contract or relax to change the size of the arterial lumen.

Veins: The veins carry blood back to the heart . Blood leaving capillaries first enters small venules, which then merge into larger veins. Veins have much thinner walls than arteries, causing them to collapse easily. The veins also have valves that allow the blood to move only toward the heart.

Capillaries: A network of tiny blood vessels referred to as a capillary bed. Arterial blood flows into a capillary bed, and venous blood flows back out. Capillaries are very thin walled, allowing for the diffusion of the oxygen and nutrients from the blood into the body tissues.

Cardiac Cycle

Cardiac cycle is defined as the events that take place at the beginning of one heartbeat to the beginning of the next heartbeat.

Phases of cardiac cycle:

Systolic:

At systolic the muscle of the right ventricles contract to eject blood into the lungs for oxygenation and the left heart contract eject blood into the systemic circulation.

Systolic occurs in three phases:

- (1)**Isovolumetric Contraction:** In the phase all the valves closed ,pressure increased due to ventricular contraction.
- (2)**Maximum Ejection Fraction:** is characterized by ejection of the blood volume at high pressure to the pulmonary and systemic circulation.
- (3)**Reduce Ventricular Ejection Rate:** In this phase ejection occur at lower velocity and pressure until pulmonary and aortic valve closed.

Diastole:

Diastole occur in four phases:

- (1)**Isovolumetric Relaxation:** it is characterized by ventricle relaxation.
- (2)**Rapid diastolic filling:** It is characterized by ventricle filling.
- (3)**Slow Diastolic Filling:** It is characterized by flow of blood from atria to ventricle due to slight increase in pressure in the ventricle.
- (4)**Atrial Contraction:** It is characterized by ventricle filling due to contraction of the atria the pressure increases preparing the ventricle for onset of systole.

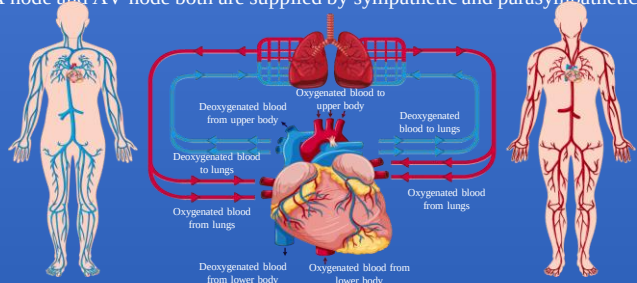
Blood supply to the Heart

Coronary arteries supplied blood to the heart coronary arteries divided into the left coronary artery and right coronary artery. The left coronary supplied 80% of the blood to the heart muscle.it is divided into two branches.

(1)left descending artery that supplies the blood to the anterior two thirds of the inter ventricular septum and adjacent part of the left ventricular anterior wall.

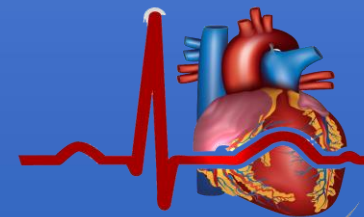
(2) circumplex coronary artery supplies blood to the lateral and posterior portion of the left ventricles the right coronary artery and its branches supply blood to the right ventricle right atrium, and left ventricle inferior wall.

Nerves supply to the heart The SA node and AV node both are supplied by sympathetic and parasympathetic nervous system.



Conduction System of the Heart

The Sino atrial node (pacemaker) produce electrical signal which regulate the pumping of the heart and the time required for contraction of various chambers. Muscle of the heart contract in response to the electrical stimulus produced by SA node which is located at the junction of the right atrium and superior vena cava.it generated electrical signal about 70 time a minute. Electrical signal then move to the left atrium through Bachmann's bundle. On the other hand electrical signal pass through the right atrial muscle move to the atrioventricular node situated in the triangle of Koch. the electrical signal receive by AV node pass to the bundle of his. the bundle of his divided into thousand of small branches called purkinje fibers. The purkinji fiber conduct electrical signal through the ventricle and produce uniform and coordinated contraction of the ventricle.



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