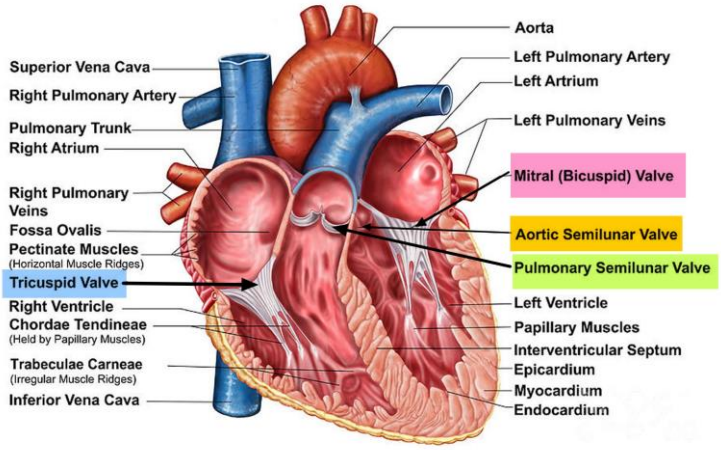
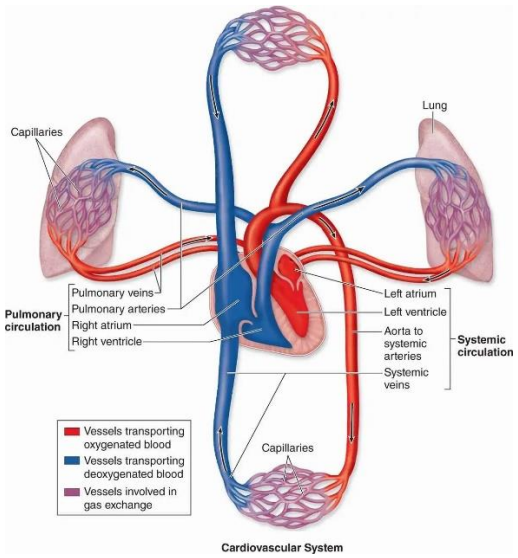
Heart





Overview of the Heart

- The heart is a vital organ responsible for pumping blood throughout the body.
- It is a muscular organ located in the chest, slightly to the left of the midline.
- The heart has four chambers: two atria (upper chambers) and two ventricles (lower chambers).

Blood Flow Through the Heart

- The heart works as a double pump, with two separate circulatory circuits: pulmonary and systemic.
- The pulmonary circuit sends oxygen-poor blood to the lungs for oxygenation, while the systemic circuit delivers oxygen-rich blood to the body's tissues.

Deoxygenated Blood Entry

- Deoxygenated blood returns to the heart via two large veins: the superior vena cava (from the upper body) and the inferior vena cava (from the lower body).
- The deoxygenated blood enters the right atrium.

Right Atrium to Right Ventricle

- The right atrium contracts, pushing blood through the tricuspid valve into the right ventricle.
- The tricuspid valve prevents backflow of blood into the atrium.

Right Ventricle to Lungs

- The right ventricle contracts, forcing blood through the pulmonary valve into the pulmonary artery.
- The pulmonary artery carries deoxygenated blood to the lungs.

Oxygenation in the Lungs

- In the lungs, blood exchanges carbon dioxide for oxygen.

- Oxygen-rich blood returns to the heart via the pulmonary veins.

Oxygenated Blood Entry

- Oxygenated blood enters the left atrium through the pulmonary veins.

Left Atrium to Left Ventricle

- The left atrium contracts, pushing blood through the bicuspid or mitral valve into the left ventricle.
- The bicuspid valve prevents backflow of blood into the atrium.

Left Ventricle to Body

- The left ventricle, being the strongest chamber, contracts forcefully to pump oxygenated blood through the aortic valve into the aorta.
- The aorta is the main artery that carries oxygen-rich blood to the entire body.

Blood Circulation in the Body

- The aorta branches into smaller arteries that distribute oxygenated blood to various organs and tissues.
- As blood flows through the capillaries in these tissues, oxygen and nutrients are delivered, and waste products are collected.

Returning Deoxygenated Blood

- Deoxygenated blood, laden with waste products, returns to the heart via small veins called venules, which merge into larger veins.
- The deoxygenated blood re-enters the heart at the right atrium, and the cycle begins anew.

Repeating the Cycle

- The heart contracts rhythmically, pumping blood through this continuous cycle, ensuring that the body receives a constant supply of oxygen and nutrients.

In summary, the heart acts as a muscular pump that orchestrates the flow of blood through a series of chambers and valves. Deoxygenated blood is received from the body, pumped to the lungs for oxygenation, and then distributed to the body's tissues. This continuous circulation is vital for maintaining life and sustaining the body's functions.

Introduction to Heart Disorders

- Heart disorders encompass a range of medical conditions that affect the structure or function of the heart.
- These conditions can disrupt the normal flow of blood through the heart and the body, leading to various health problems.

Coronary Artery Disease (CAD)

- CAD is the most common heart disorder and occurs due to the buildup of plaque in the coronary arteries.
- Plaque narrows the arteries, reducing blood flow and oxygen supply to the heart muscle.
- This can lead to chest pain (angina) or even a heart attack if a coronary artery becomes completely blocked.

Arrhythmias

- Arrhythmias are irregular heart rhythms that can be too fast (tachycardia) or too slow (bradycardia).
- They disrupt the heart's ability to pump blood effectively, potentially causing dizziness, palpitations, or fainting.
- Severe arrhythmias can be life-threatening.

Heart Valve Disorders

- Heart valves regulate blood flow through the heart's chambers.
- Disorders like stenosis (narrowing) or regurgitation (leaking) of valves can impair normal blood circulation.
- Patients may experience shortness of breath, fatigue, or chest pain.

Heart Failure

- Heart failure occurs when the heart can't pump blood adequately to meet the body's demands.
- It can result from various causes, including CAD, high blood pressure, or damaged heart muscles.
- Symptoms include fatigue, swelling (edema), and difficulty breathing.

Congenital Heart Defects

- Congenital heart defects are present at birth and can affect the heart's structure or function.
- They range from simple defects with minor impact to complex defects requiring surgical correction.
- Symptoms depend on the type and severity of the defect.

Cardiomyopathies

- Cardiomyopathies are diseases that affect the heart muscle, making it weak or thickened.
- This can impair the heart's pumping ability, leading to heart failure.
- Cardiomyopathies can be genetic or result from other conditions like high blood pressure.

Myocardial Infarction (Heart Attack)

- A heart attack occurs when a coronary artery is blocked, usually by a blood clot.
- This leads to damage or death of the heart muscle supplied by that artery.
- Symptoms include chest pain, shortness of breath, and nausea.

Peripheral Artery Disease (PAD)

- PAD involves the narrowing of arteries outside the heart, usually in the legs.
- Reduced blood flow can cause pain, cramping, or numbness in the legs, especially during physical activity.
- Severe PAD may lead to tissue damage or amputation.

Hypertrophic Cardiomyopathy (HCM)

- HCM is a genetic condition where the heart muscle thickens abnormally.
- This can obstruct blood flow out of the heart, causing symptoms like chest pain and fainting.
- It's a common cause of sudden cardiac death in young athletes.

Conclusion

Heart disorders encompass a wide range of conditions that affect the heart's structure or function, often disrupting the normal flow of blood through the body.

Understanding these disorders is crucial for early detection, proper management, and prevention through lifestyle changes and medical interventions. Regular check-ups and a healthy lifestyle are essential for maintaining heart health.