
Poster Presentation

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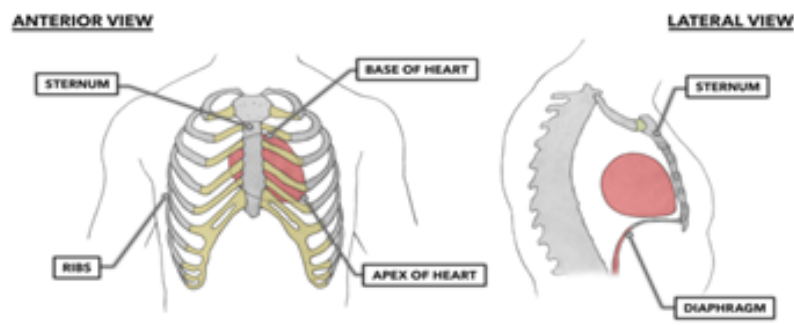
Module: Introduction to
Physiology

Module Code: BMHP5003_BIRM

Lecturer: Giridhar Kiti

Cardiovascular System

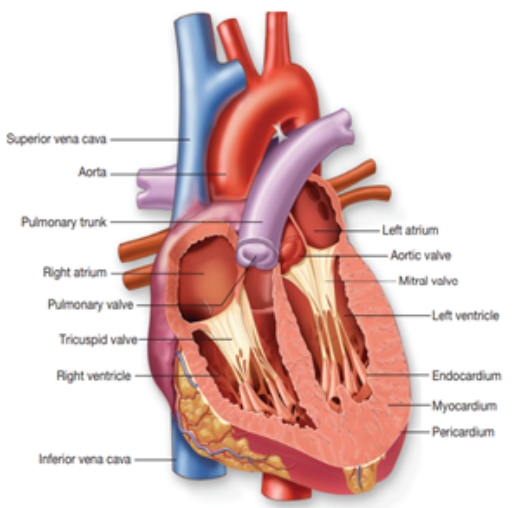
Anatomy of Heart



(Kilgore, 2020)

Right Chamber

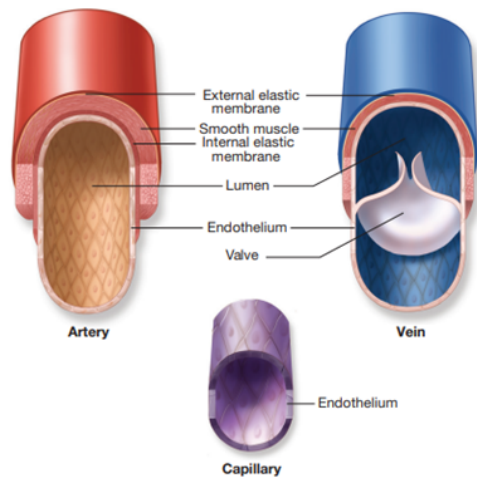
- The right atrium and ventricles lie anteriorly (Tortora and Derrickson, 2018, p.702).
- The Tricuspid valve separates the right atrium and ventricle.
- The right ventricle only pumps blood to the lungs and is directly connected to the lungs by the Pulmonary artery and Pulmonary valves.
- These valves allow blood flow in on-direction and leave the heart without the backflow (Tortora and Derrickson, 2018, p.702).
- The right atrium is connected to two large veins that carry oxygen-poor blood from the lower and upper parts of the body, known as Inferior and Superior Vena-cava (Marieb and Hoehn, 2007, p.705).



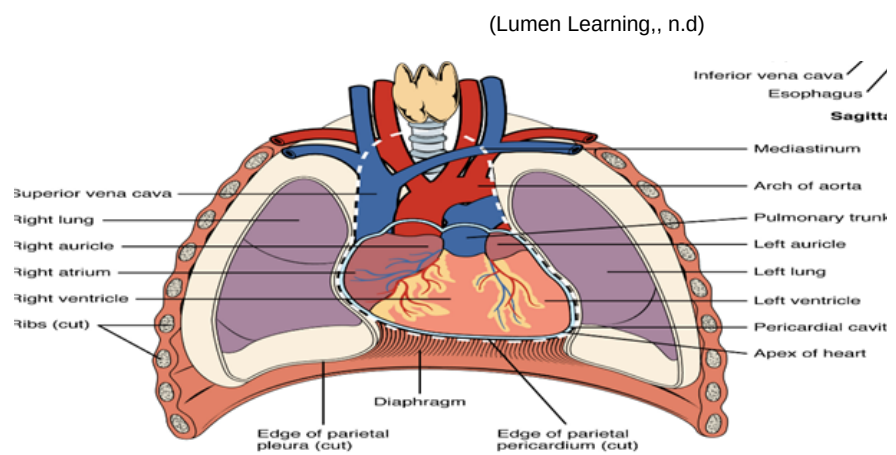
(Pearson education, n.d, p.150)

Left Chamber

- The left atrium and ventricles lie posteriorly.
- The Mitral or Bicuspid valves separate the left side atrium and ventricle (Tortora and Derrickson, 2018, p.702).
- The left atrium is also attached to the lung by Pulmonary veins.
- The left ventricle has a thicker muscular wall than the right ventricle because it needs to generate high pressure to pump blood throughout the body (Tortora and Derrickson, 2018, p.702).
- The left ventricle is connected to the Aorta artery, the largest artery that pumps oxygenated blood and is separated by the aortic valve (Marieb and Hoehn, 2007, p.746).



(Pearson education, n.d, p.155)



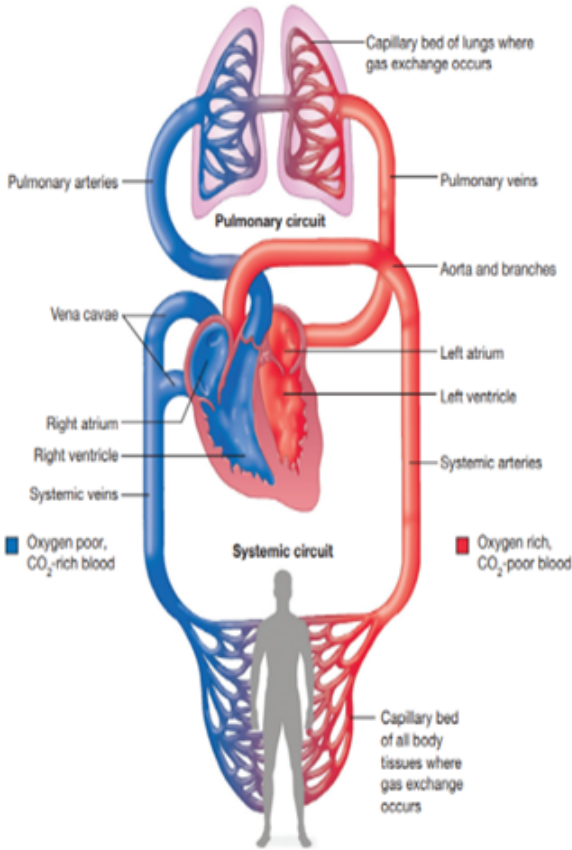
(Lumen Learning,, n.d)

Three types of main blood vessels:

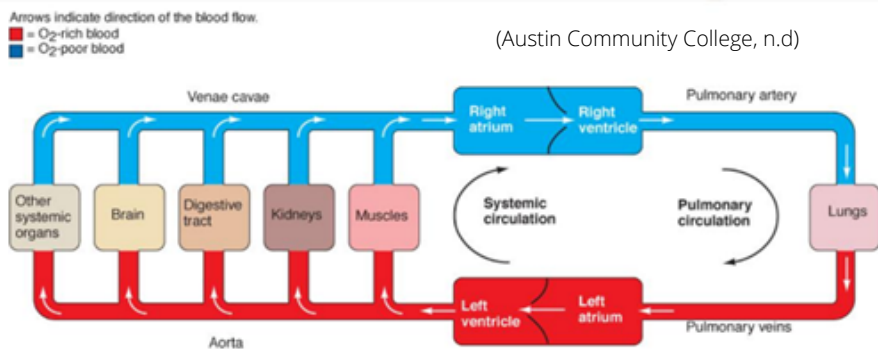
- Arteries:** they have thicker muscular walls, have narrow lumen and transport blood away from the heart.
- Veins:** they have thinner muscular walls, wider lumen and carries blood to the heart.
- Capillaries:** they connect arteries and veins, have one cell thick wall because they allow the exchange of molecules (Mitchell and Schoen, 2010).

Function of the Heart

(Pearson education, n.d, p.148)



The heart's primary purpose is to pump blood throughout the body. Deoxygenated blood flows from the right side of the body into the right atrium through large veins called inferior and superior Vena-cava (Jain, Bordes and Bhardwaj, 2020). Then the blood shifts into the right ventricle to contract and is pumped out of the heart towards the lungs to exchange carbon dioxide for oxygen; this is called Pulmonary circulation (Wilk-Blaszczak, 2018).

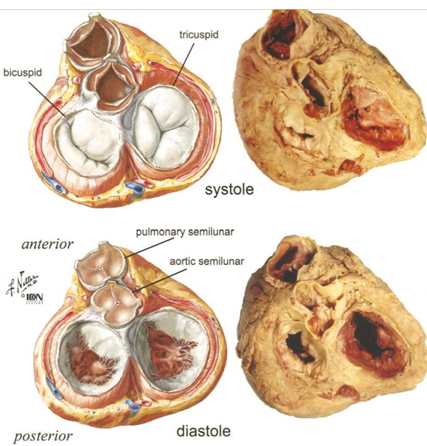


(Austin Community College, n.d)

Oxygenated blood flows through the pulmonary veins into your left atrium. Then moves to the left ventricle through the Aorta to supply oxygen to the cells and tissues (Weinhaus and Robert, 2005). In systematic circulation, the oxygen is exchanged for carbon dioxide, resulting in oxygen-poor blood, which then enters back to the right atrium through the superior or inferior Vena cave. It allows the blood to travel through blood vessels to give oxygen and nutrients to the organs, maintain the hydration level and fight any injury or diseases in the body (Weinhaus and Robert, 2005).

Pulse and Blood Pressure

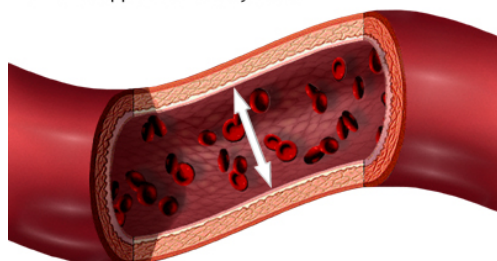
(Weinhaus and Robert, 2005)



The first thump of heartbeat is the sound of the tricuspid and mitral valves closing and the pulmonary and aortic valve opening simultaneously; called as Systole (Leng et al., 2015). The second thump is caused when the pulmonary and aortic valves close and mitral and tricuspid valves open automatically called as Diastole.

Following every heartbeat, a pressure signal passes down the arteries causing the arterial walls to bulge and contract; these are called Pulses. The overall force exerted against the arterial walls by blood is called blood pressure. It is measured by two numbers representing two figures of force exerted during systole and diastole (NHS, 2019).

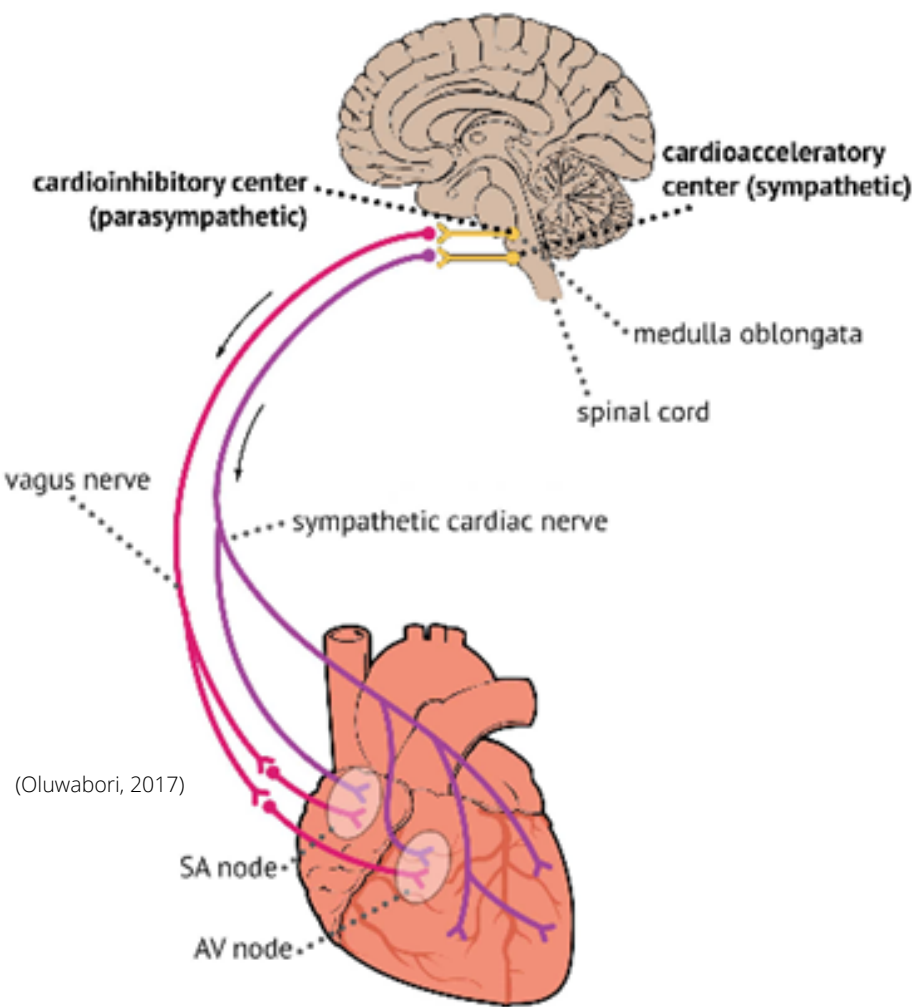
Blood pressure is the measurement of force applied to artery walls



(Chen,2020)

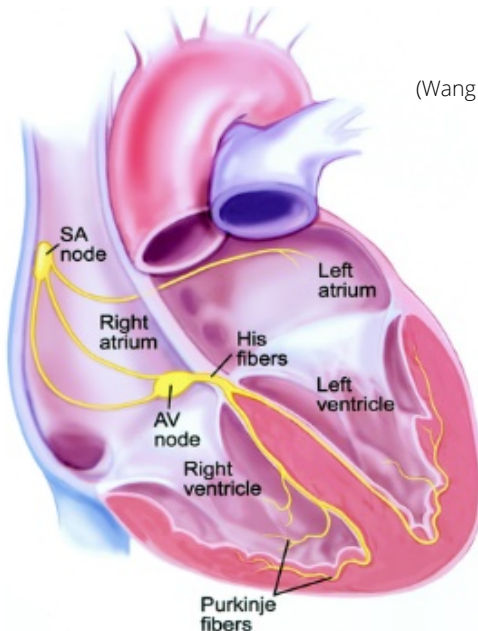
Regulation of the Heart Rate

The heart structure does not need any external stimulus to maintain its regular rhythm, and it has intrinsic and extrinsic factors (Boyett, 2006). The intrinsic factors are Sinoatrial nodes (SA) and Atrioventricular nodes (AV) that helps to maintain the heartbeat. These nodes send the signal to cardio tissues to contract. SA nodes generate nerve impulses, causing both atria to contract (Monfredi et al., 2010). These impulses meet the AV nodes with a delay of 0.1 seconds so that the blood entirely is emptied into the ventricles before they contract. Then the AV nodes send impulses, causing ventricles to contract and push the blood out of the heart to other parts of the body (Boyett, 2006).



(Oluwabori, 2017)

Heart rate is also regulated by external signals coming from the Sympathetic and Parasympathetic systems (Peate and Nair, 2010, p.314).

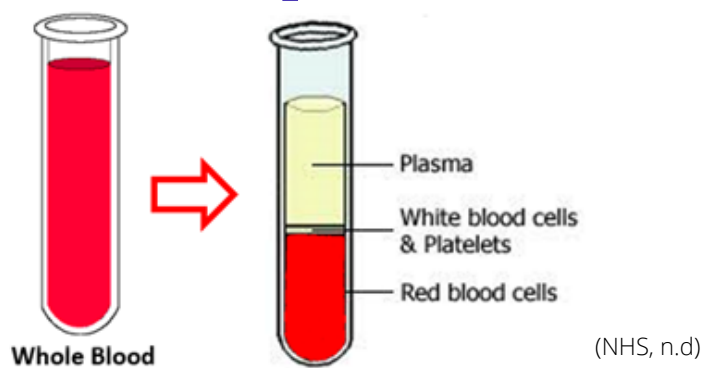


(Wang and Estes, 2002)

- The Sympathetic system:** This system is responsible for increasing heart muscle contraction and is connected to the heart by the sympathetic cardiac nerve (McCorry, 2007).
- The Parasympathetic system:** Mainly responsible for slowing the heart rate and connected to the heart by the Vagus nerve. It decreases the heart muscle contraction and reduces the resting heart rate as low as 20 or 30 BMP (McCorry, 2007).

According to Zhang and Zhang (2019), heartbeats average 60 to 100 beats per minute, depending on age, physical size and fitness, genetics, drugs and physiological status.

Blood Composition



Three components of blood
Plasma: carries proteins, nutrients, and hormones.
Erythrocytes: contains haemoglobin which carries oxygen from the lungs to other parts of the body and transfers carbon dioxide to the lungs.
Leukocytes: part of the immune defence system and help fight diseases or infection (NHS, n.d).

Cardiovascular Homeostasis

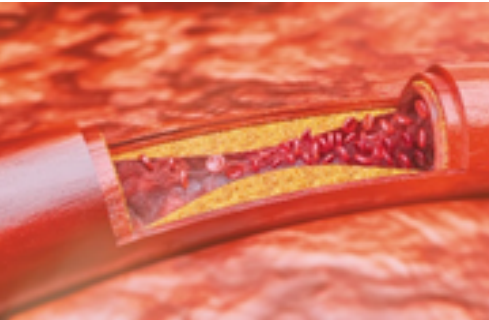
The cardiovascular system is vital in maintaining the body's homeostasis (Abboud, Benson, 2015). An effective cardiovascular system ensures that the blood is redirected to tissues to maintain homeostasis. Some of the examples are:

- Skin: The cardiovascular system delivers immune cells, removes toxins, and brings heat to the skin that helps regulate body temperature and maintain homeostasis (Shalaby, 2019).
- Brain: It helps generate cerebral spinal fluid, vital for delivering oxygen to the brain cells.
- Muscles: It also helps maintain homeostasis by providing oxygen and nutrients to the muscles and removing carbon dioxide, allowing them to move (Shalaby, 2019).
- Kidney: kidneys use the blood pressure from the cardiovascular system to filter the waste out of the body and maintain its homeostasis (Shalaby, 2019).

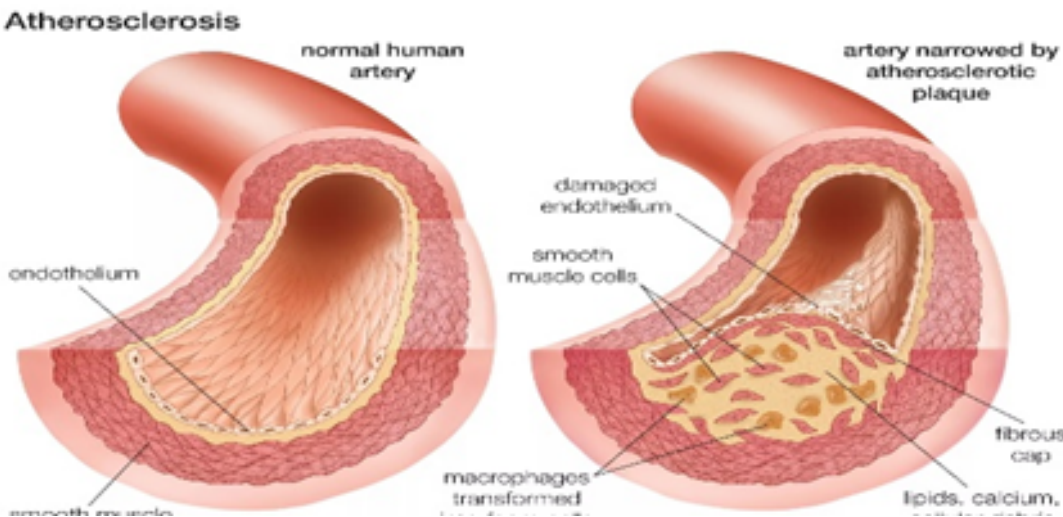
Disorder

According to World Health Organisation (WHO), one of the leading causes of death globally is cardiovascular diseases (CVD) (WHO, 2021). CVD is a generic term for disorders associated with the heart or the vessels, such as atherosclerosis (NHS, 2018). Atherosclerosis is when fatty deposits build up and harden in the arteries, restricting blood flow (NHS, 2019). It can cause a heart attack or stroke.

(Harvard Health Publishing, N.D)



(Fogoros, 2020)



Health Interventions

According to NHS, adopting a healthy lifestyle can reduce the risk of atherosclerosis (NHS, 2019). Some of the examples are:

- Regular exercising
- Quitting smoking
- Eating vegetables and fruits
- Reduction in salt
- Avoiding alcohol
- Maintain healthy body weight

According to WHO, 75% of CVD deaths are recorded in low to middle-income countries and suggest governments enhance their health system so this disease can be deducted in early stages and treated. (WHO, 2021).

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