

# Cardiovascular System-1

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 Cardiovascular Physiology  
**Medical Students**  
 FALL 2022-2023

Textbook: Textbook of Medical Physiology

By: Arthur C. Guyton & John E. Hall 13th Edition 2016 or 14th edition 2021

<b>Lecture Topics</b>	<b>Guyton 13th</b>	<b>Guyton 14th</b>
1. Introduction	61-70,109-112	63-72, 113-117
2. Cardiac mm. Physiology	109-112	113-117
3. Conduction System of the heart	123-129	127-133
4. Electrocardiography	131-137	135-141
5. Electrocardiography-	139-147	143-150
6. Electrocardiography-	147-165	150-168
7. Heart as a pump and cardiac cycle	113-122	117-126
8. Heart as a pump and cardiac cycle-		
9. Heart as a pump and cardiac cycle -		
10. Cardiac output and venous return	245-258	245-258
11. Cardiac output and venous return		
12. Cardiac output and venous return		
13. Circulation / systemic/ Haemodynamics	169-188	171-192
14. Circulation / Haemodynamics		
15. Circulation / Haemodynamics		
16. Arterial System/Regulation of arterial blood pressure	215-225	217-228
17. Arterial System/ Regulation of ABP-	227-243	229-244
18. Arterial System/ Regulation of ABP-		
19. Blood flow / Tissues and its control	203-213	205-216
20. Special circulations (coronary Muscle blood flow and exercise)	259-269	259-269

**Optional Readings:**

1. Physiology , latest edition , by : Berne and Levy last edition
2. Physiological Basis of Medical Practice, twelfth edition , by : John B. West 1990.
3. Human physiology from cells to systems, latest edition, by: Lauralee Sherwood. Last edition

# Clinical Problem

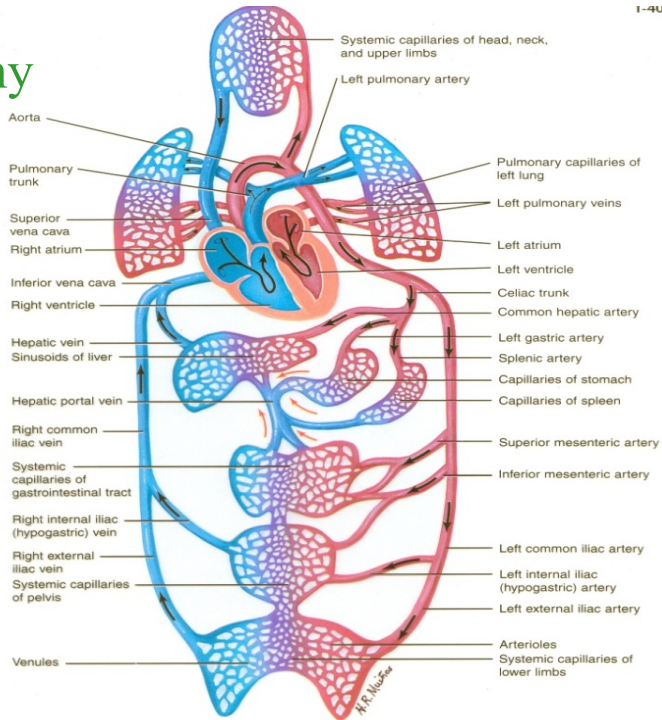
A 54 years old man seen in the cardiology clinic complaining of **severe weakness, fatigue, dry cough, weight gain and difficulty in breathing**. He feels **severe shortness of breath while walking up stairs** of his second floor apartment. He still complains of lesser severity of symptoms at rest. He states he often **awakens at night feeling like he was suffocating**. He is now sleeping with **three pillows under his head**. Lately he has taken to fall asleep while he is sitting watching T.V. He also complains of having to **urinate 3-4 times per night**. He was hospitalized with heart problem two months ago and was told that the **efficiency of his heart is less than 30%** and he **needs ??** and has to **wait until??**. On examination his weight is 95Kg, height is 165 cm, blood pressure was 140/85 mmHg, his heart rate 90 beats/min and regular, his resp. rate is 28/min and labored.

Auscultation of the heart reveals abnormal heart sounds

# Objectives:

- Introduction to the CVS physiology
- Review the anatomy of the CVS.
- List the functions of the CVS
- Comprehend the pump nature of the heart

# Cardiovascular System Anatomy



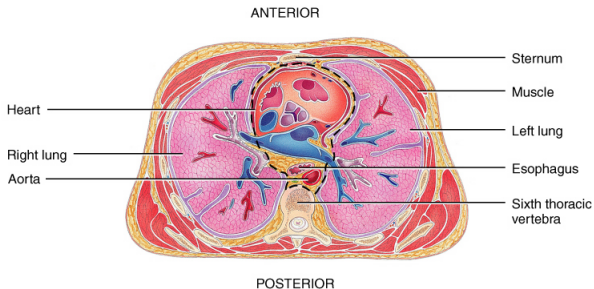
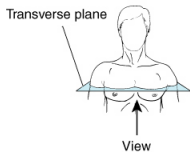
General plan of circulation

# History of cardiac Transplant

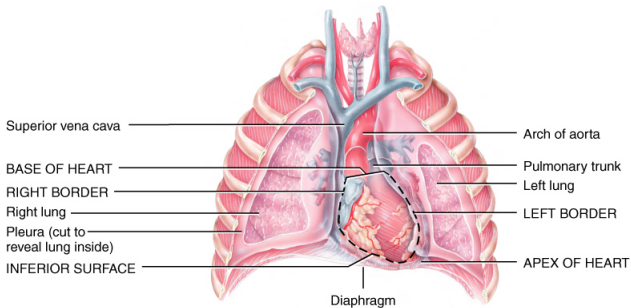
- **In 1967**, Christiaan Barnard in Cape Town, South Africa transplanted the first Human Heart removed from a 25-year-old woman who had died following an auto accident and placed it in the chest of Louis Washkansky, a 55-year-old man dying of heart damage. The patient survived for 18 days. The problem was Rejection- Cyclosporine – immunosuppressant -decreased that.
- **In 1984, the world's first successful pediatric heart transplant** was performed at Columbia on a four-year-old boy. He received a second transplant in 1989 and continues to live a productive life today.

## History of cardiac Transplant...cont

- **In 1984**, in Linda Loma, California, Leonard Bailey, implanted a baboon heart into a 12-day-old girl, she survived for twenty days.
- **In 1982** in University of Utah, the first Total Artificial Heart was implanted in the chest a dentist Barney Clark by William DeVries. Clark survived for 112 days-The problem was blood clotting.



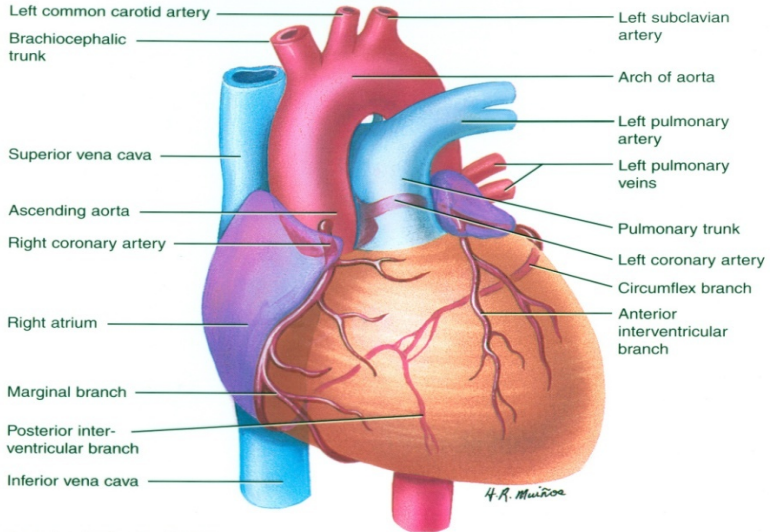
(a) Inferior view of transverse section of thoracic cavity showing the heart in the mediastinum



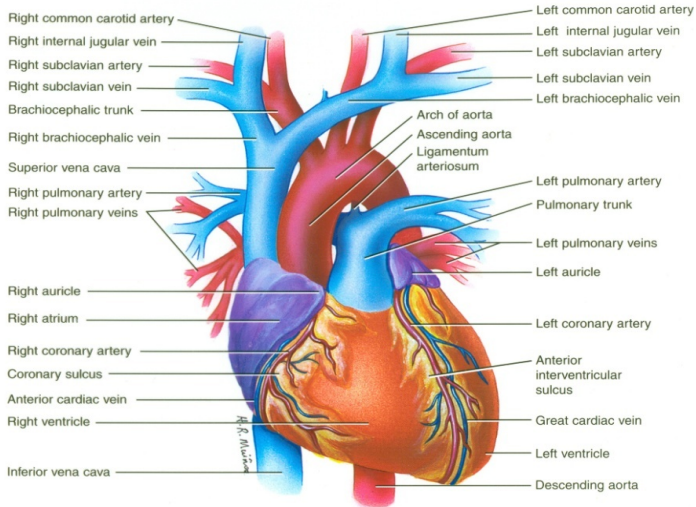
(b) Anterior view of the heart in the mediastinum



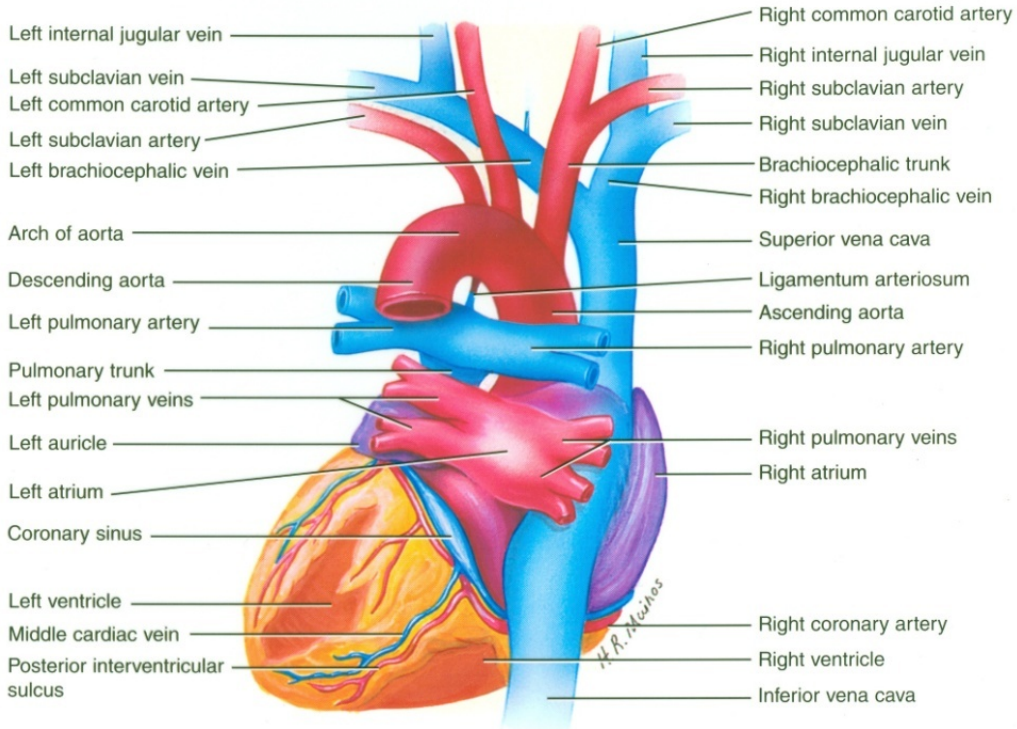
# Anatomy of the heart



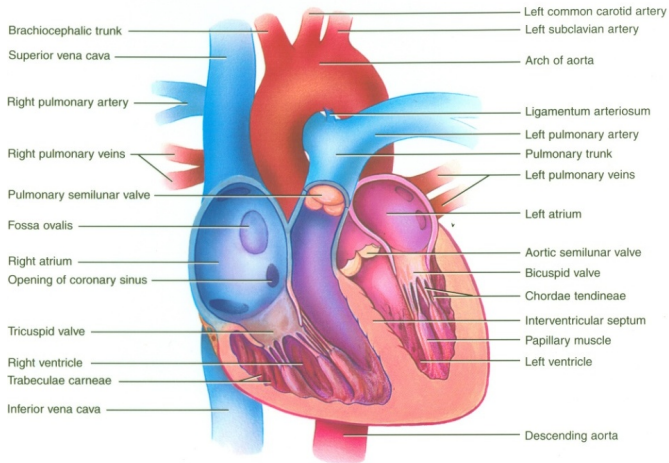
# Anatomy of the heart



Anterior External View of Structure of Heart, Fig# 20.4a

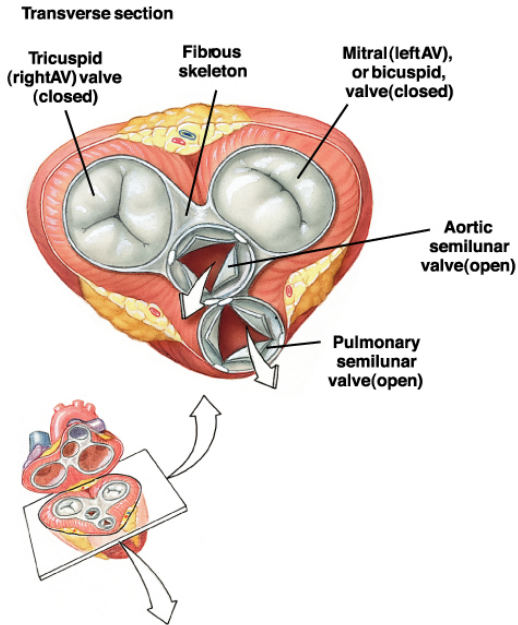


# Cardiac valves

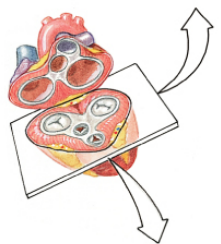


Anterior View of Frontal Section of Structure of Heart, Fig# 20.4d

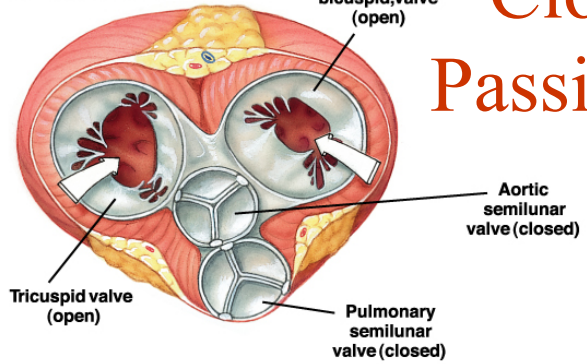
# Cardiac valves



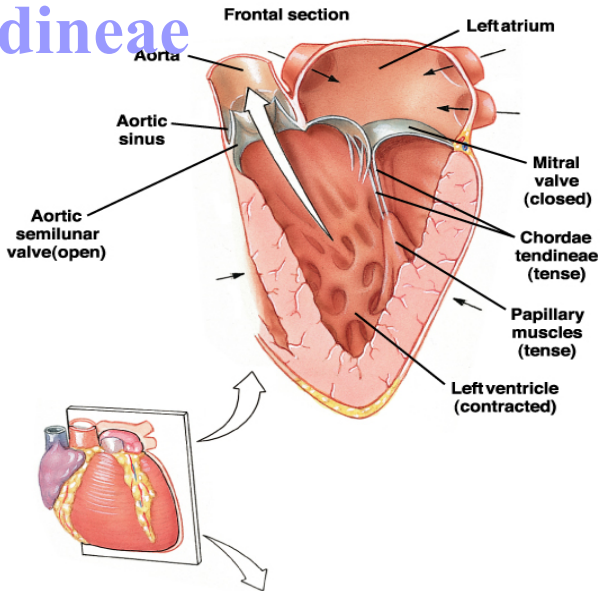
# Cardiac Valves Open and Close Passively



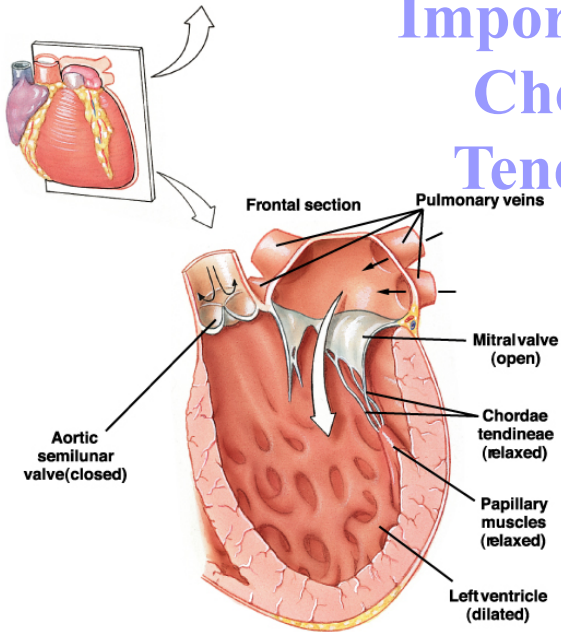
**Transverse section**



# Importance of Chordae Tendineae



# Importance of Chordae Tendineae

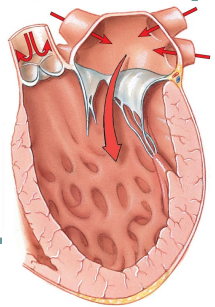
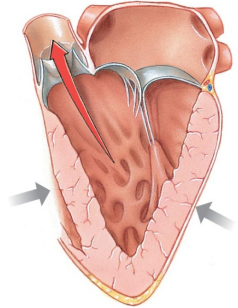




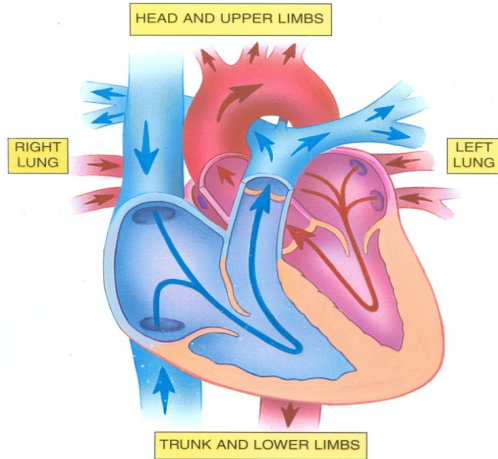
# Functional Anatomy of the Heart Valves

- Function is to prevent backflow
  - Atrioventricular Valves
    - Prevent backflow to the atria
    - Prolapse is prevented by the chordae tendinae
    - Tensioned by the papillary muscles

- Semilunar Valves
  - Prevent backflow into ventricles



# Movement of blood in the heart



Blood Flow: Path of Blood Through Heart, Fig# 20.6a

# Thank You

