

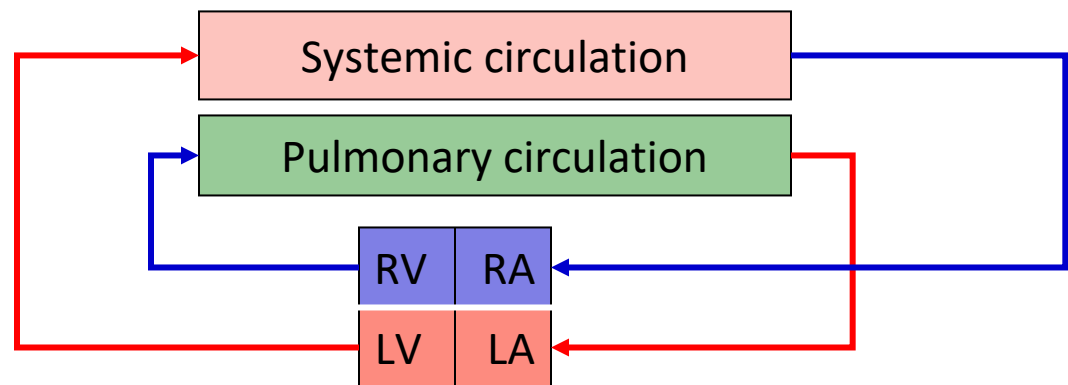
Cardiovascular system

Introduction

- Need of circulatory system
- Components of circulatory system
- Type of pump
- Primary & secondary roles

Cardiovascular system of mammals

General Plan



System of vessels that carry blood

The force for movement of blood is provided by **heart**

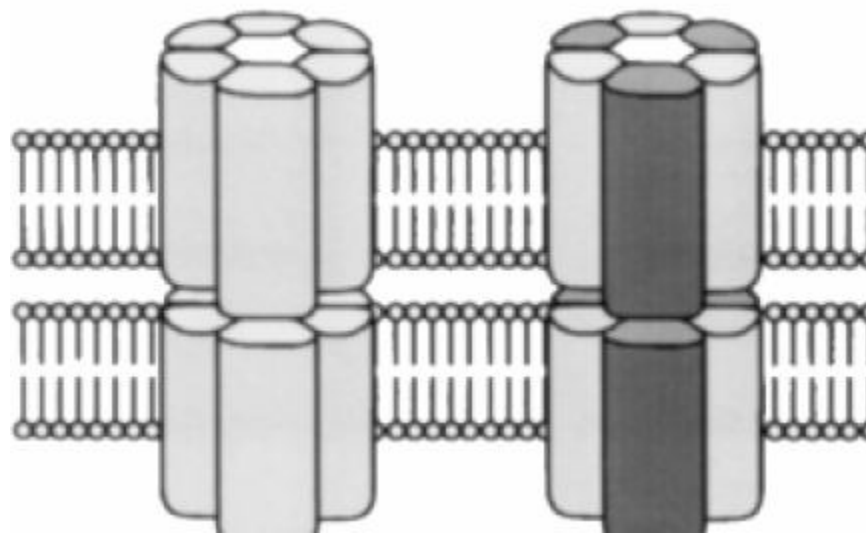
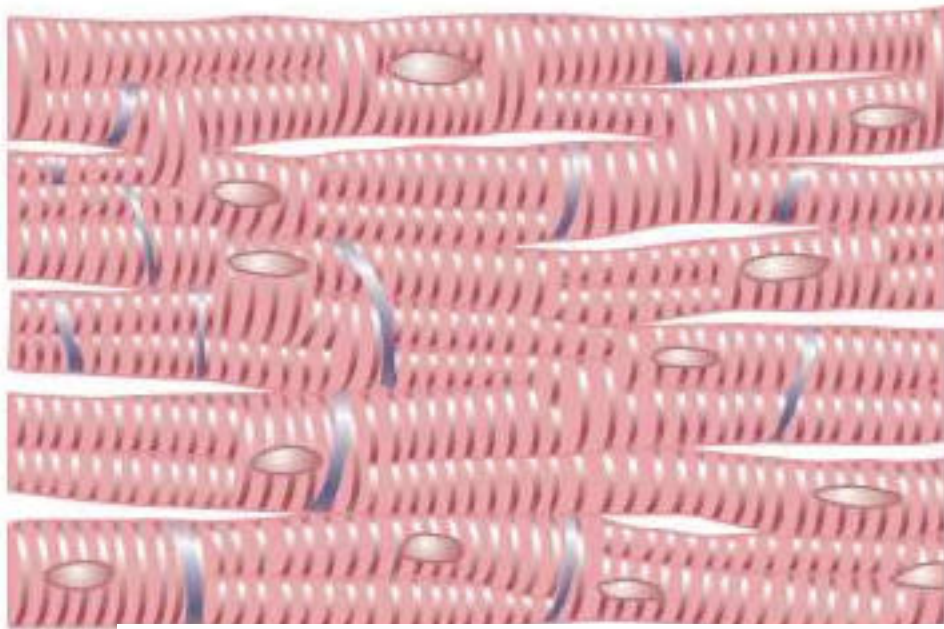
Two major loops of flow : **systemic circulation** and **pulmonary circulation**

Components

- 4 chambered heart
- Arteries
- Capillaries
- Veins

Morphology of heart

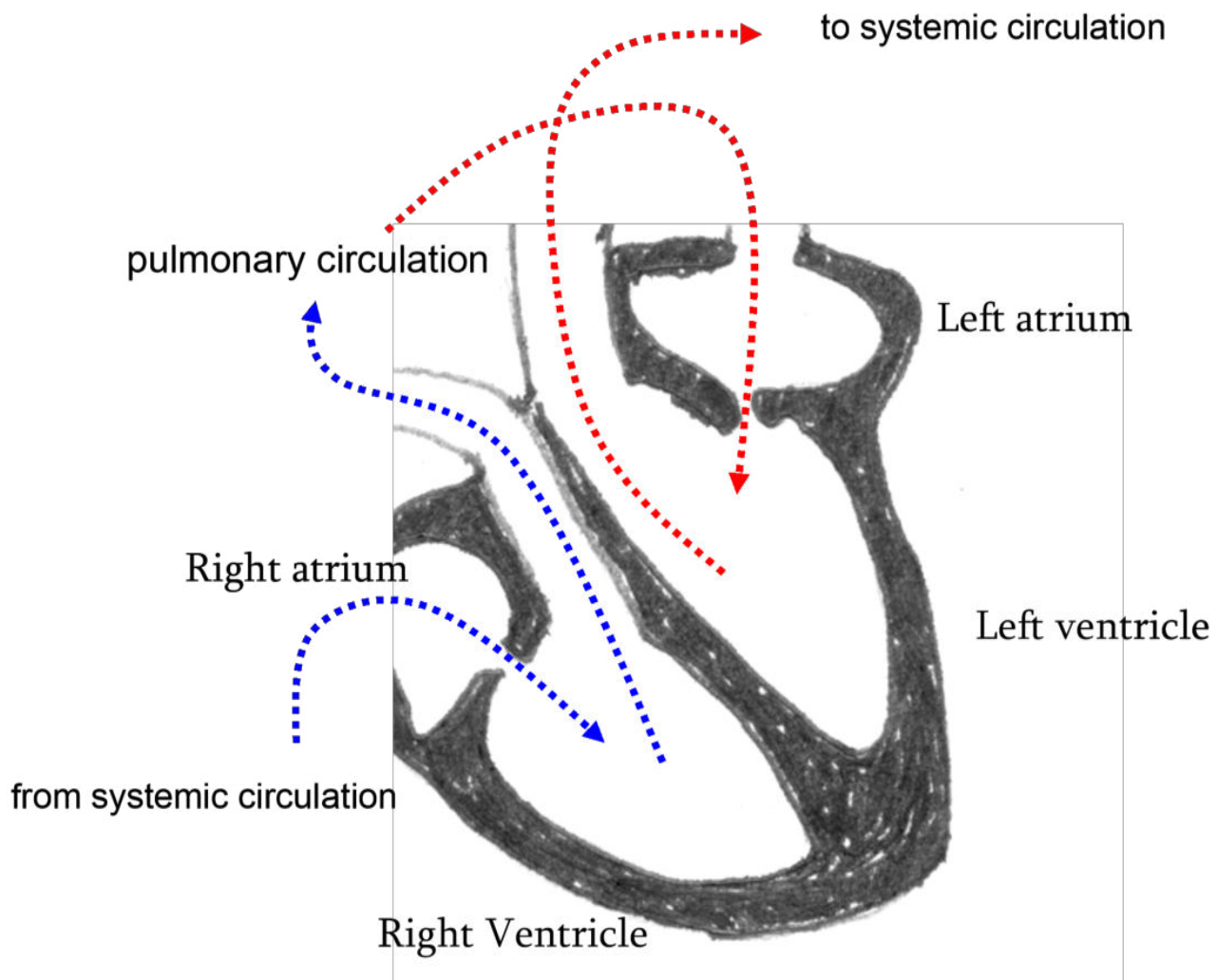
- The average adult human heart is about 12 cm from base to apex, 8 – 9 cm wide at its broadest transverse diameter and 6 cm anteroposteriorly.
- The weight of the heart is about 300 g in males and 250 g in females
- Double layered pericardial layer containing fluid allow contractile motion of the heart without friction
- The atrium myocardium is electrically separate from the ventricular myocardium by fibrous tissue



Functional features of the heart

1. Pump the blood
2. Maintain unidirectional flow
3. Generate high pressure
4. Separation of pulmonary circulation
5. Modify the function as per specific requirements of circulation

Functional Organization of the heart



Heart as a set of two functional pumps

Right pump

Components

Right atrium and Right ventricle

Input :

vena cava

Output :

pulmonary artery

Valves :

Vena cava and Right atrium

Right atrium and Right ventricle

Right ventricle and pulmonary artery

Thickness of right ventricle wall : 3 -5 mm

Pressure generated : 25 mmHg during systole

Left pump

Components

left atrium and left ventricle

Input : Pulmonary vein

Output : Aorta

Valves :

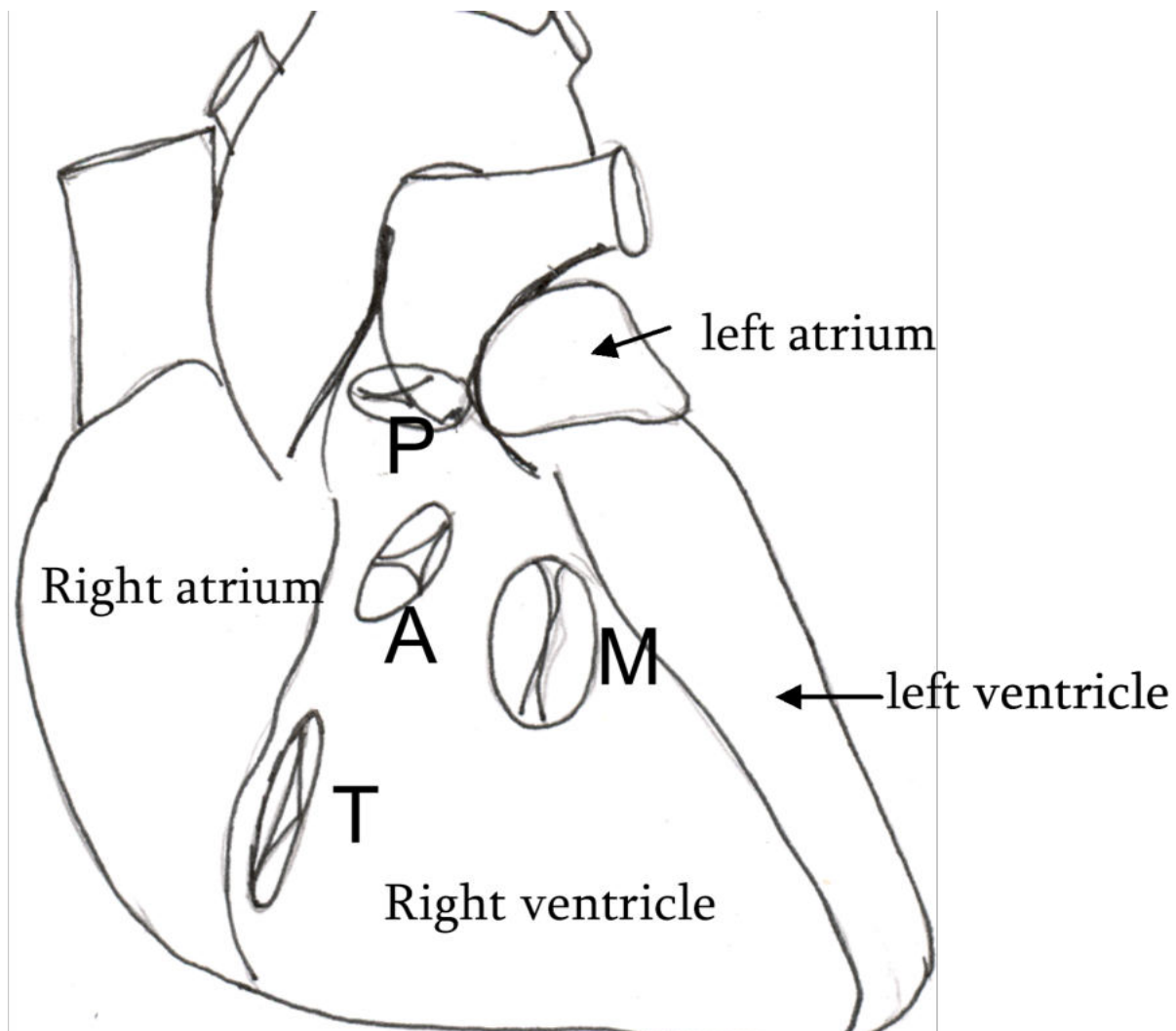
Pulmonary vein and Left atrium

Left atrium and Left ventricle

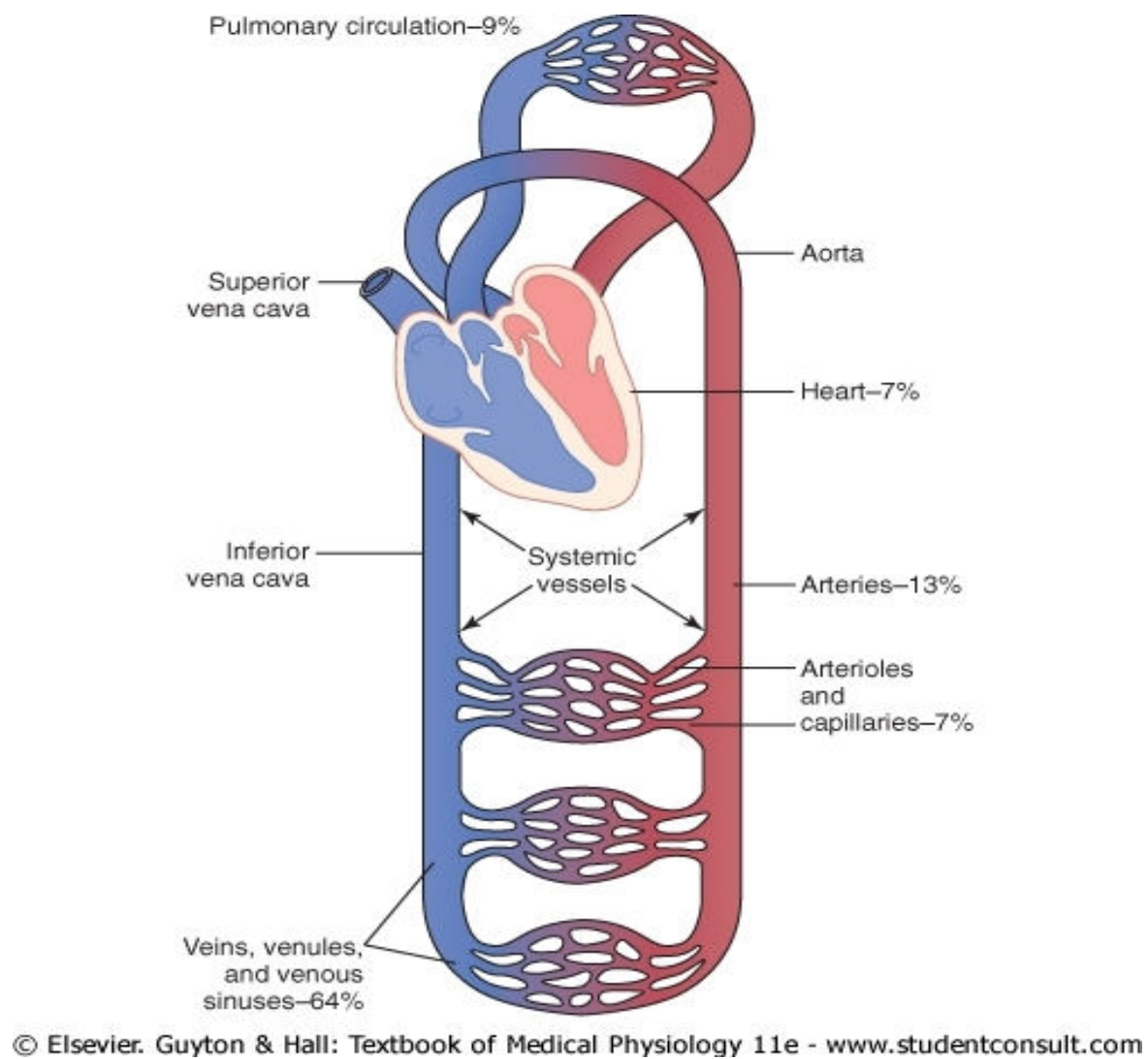
Left ventricle and Aorta

Thickness of ventricle wall : 9 mm

Pressure generated : 120 mmHg during systole



Distribution of blood in circulation



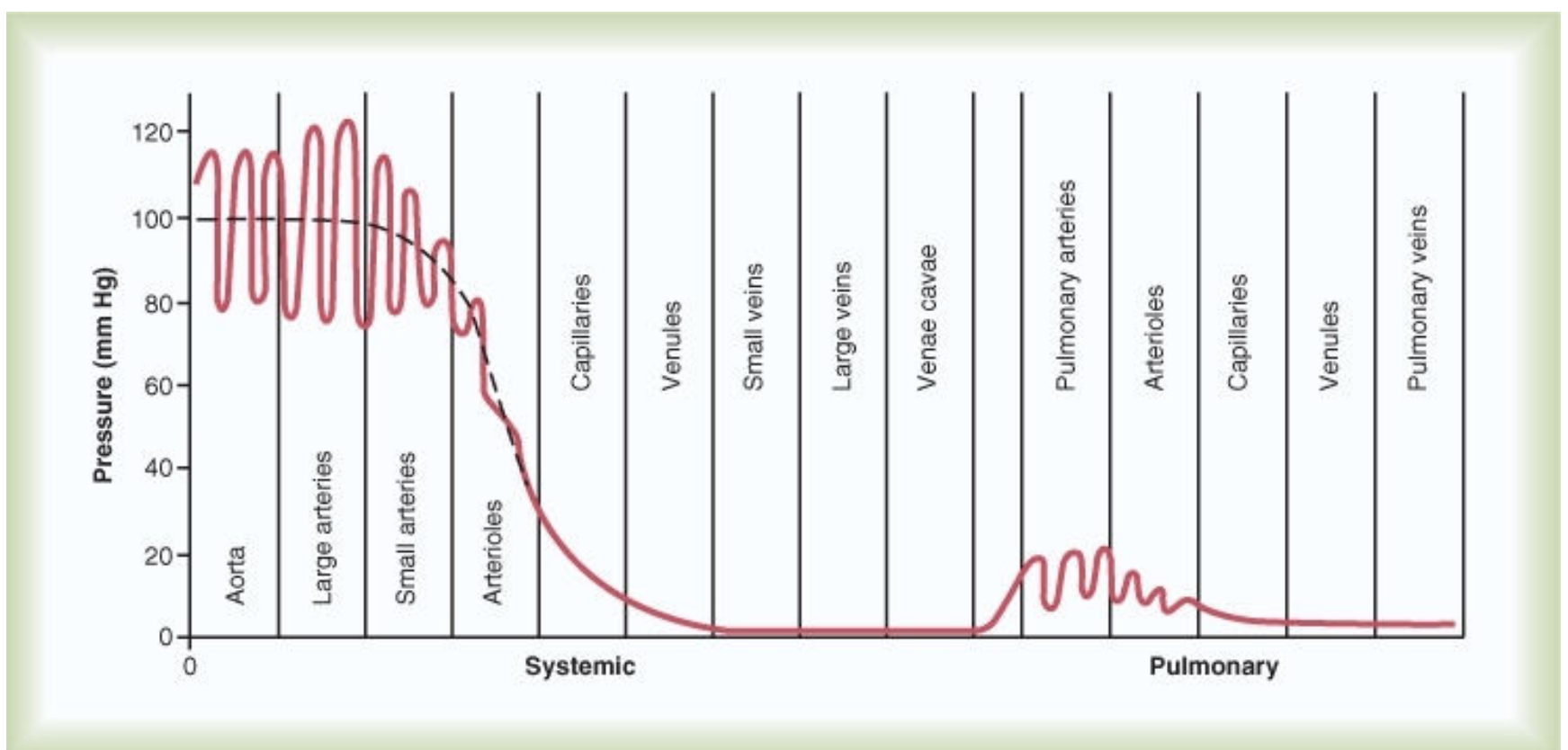
Functional aspects of cardiovascular system

- Changing metabolic needs
- Integration with other systems
- Safety margin or physiologic reserve
- Pathology resulting in diseases

Functional aspects of cardiovascular system

- Intermittent cardiac output but continuous flow to tissues
- Dampening of pulsatile arterial flow at capillary level
- Inverse Relation of cross-sectional area with velocity of blood flow

Pressures in circulatory system



THANK YOU

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