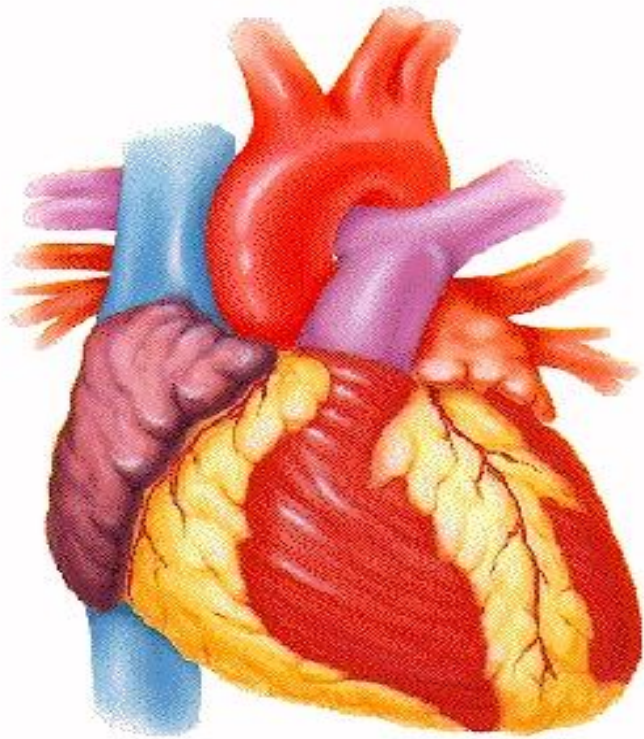
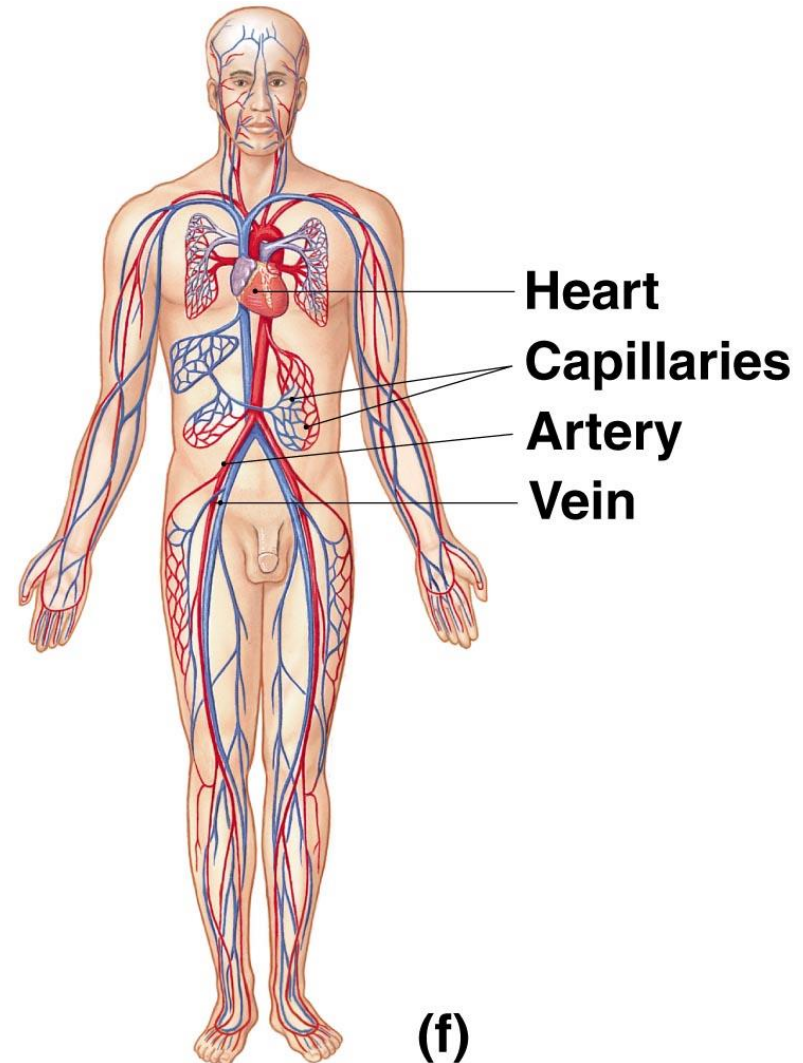


Introduction to the Human Cardiovascular System



INTRODUCTION

- ▶ The cardiovascular system is transport system of body
- ▶ It comprises blood, heart and blood vessels.
- ▶ The system supplies nutrients to and remove waste products from various tissue of body.
- ▶ The conveying media is liquid in form of blood which flows in close tubular system.



FUNCTION OF CARDIOVASCULAR SYSTEM

- ▶ **Transport nutrients, hormones**
- ▶ **Remove waste products**
- ▶ **Gaseous exchange**
- ▶ **Immunity**
- ▶ **Blood vessels transport blood**
 - **Carries oxygen and carbon dioxide**
 - **Also carries nutrients and wastes**
- ▶ **Heart pumps blood through blood vessels**

COMPONENTS OF CARDIOVASCULAR SYSTEM

- BLOOD**

- HEART**

- BLOOD VESSELS**

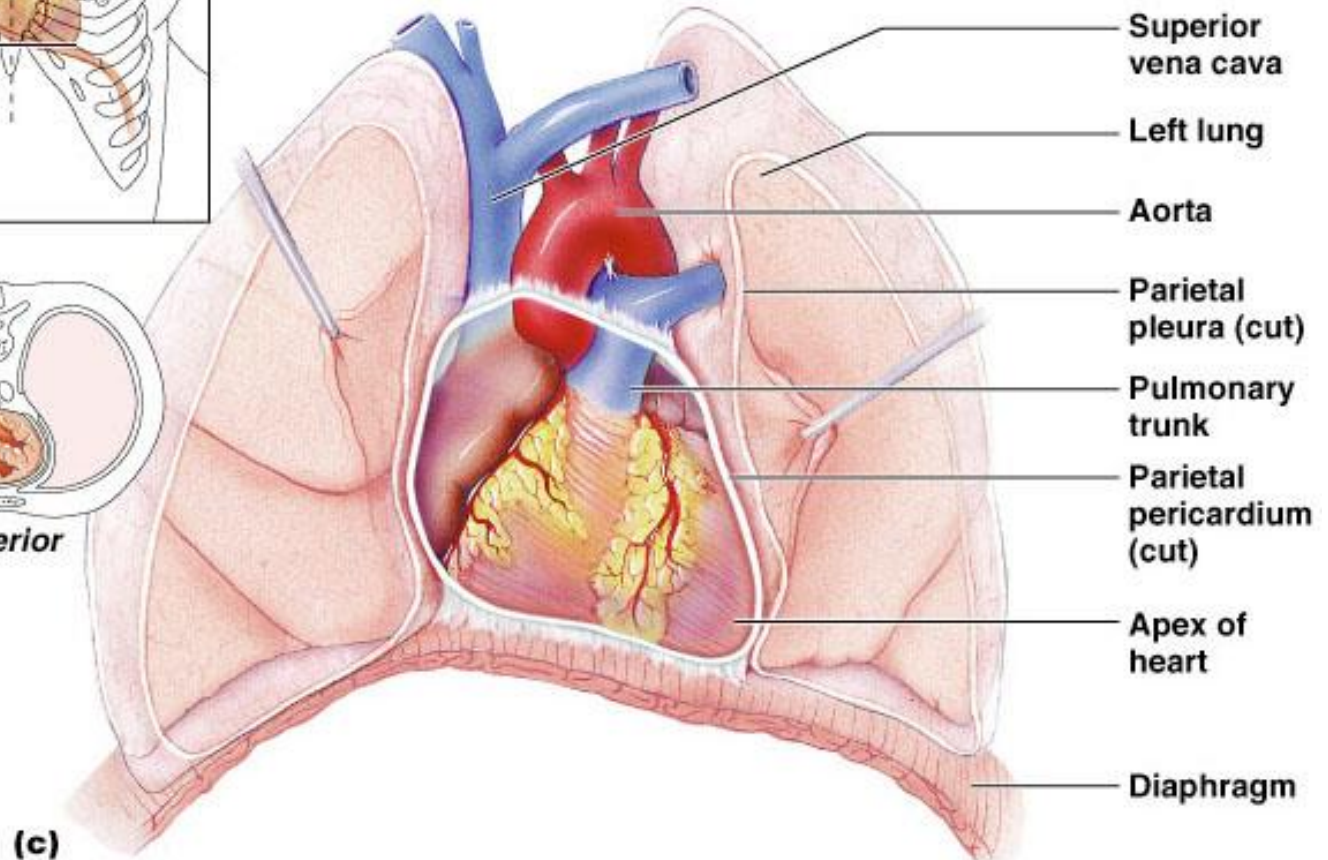
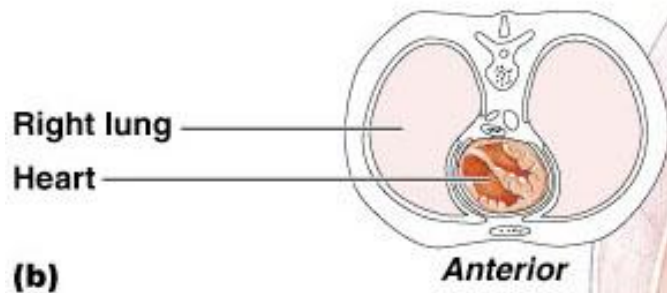
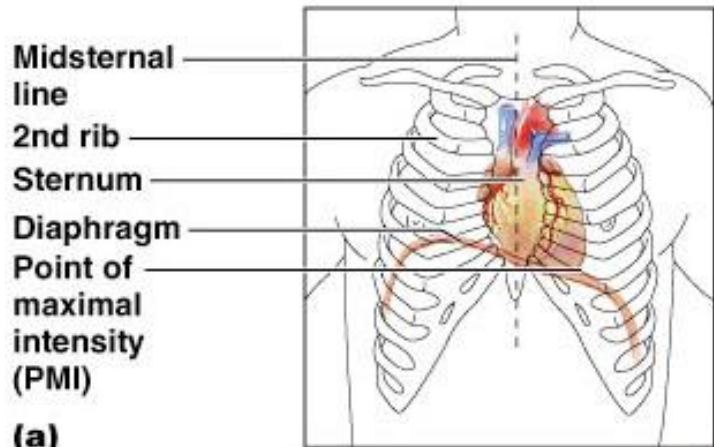
BLOOD

- **The Blood: Blood cells & Plasma**
- **Blood cells**
 - 1- Erythrocytes - Red Blood Cells**
 - 2- Leucocytes**
 - 3- Thrombocytes**
- **Plasma is fluid portion**

HEART

- Heart is a four chambered, hollow muscular organ approximately the size of your fist
- Location:
 - Superior surface of diaphragm
 - Left of the midline
 - Anterior to the vertebral column, posterior to the sternum

HEART



FUNCTIONS OF THE HEART

- **Generating blood pressure**
- **Routing blood**
 - Heart separates pulmonary and systemic circulations**
- **Ensuring one-way blood flow**
 - Heart valves ensure one-way flow**
- **Regulating blood supply**
 - Changes in contraction rate and force match blood delivery to changing metabolic needs**

BLOOD VESSELS

- **Blood Vessels -A closed network of tubes**

- **These includes:**



Arteries



Capillaries



Veins

BLOOD VESSELS

-Arteries(Distributing channel)

- **Thick walled tubes**
- **Elastic Fibers**
- **Circular Smooth Muscle**

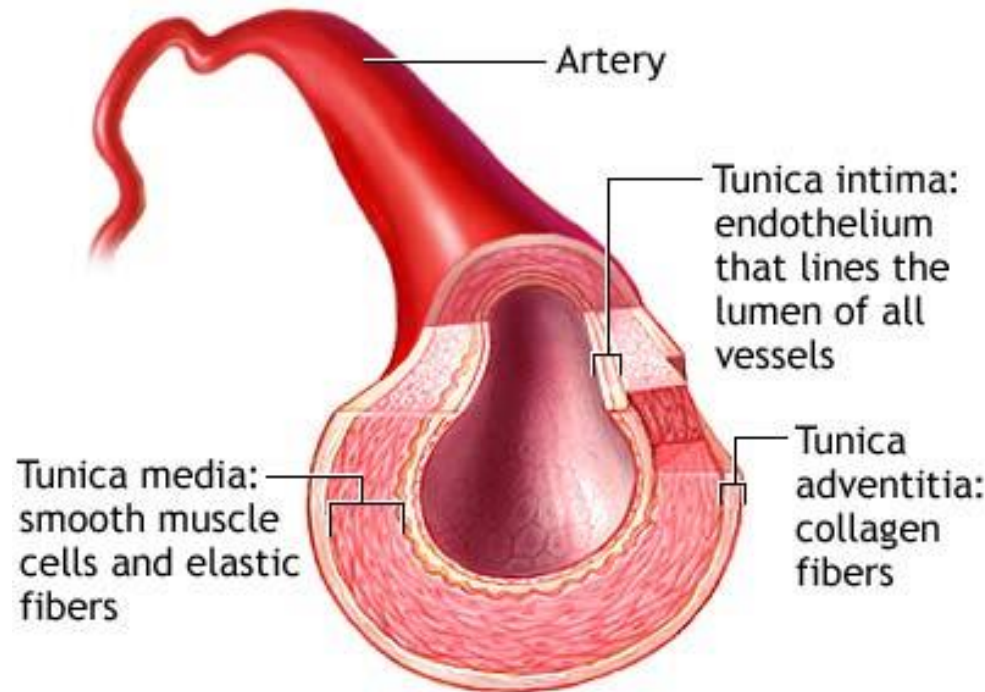
–Capillaries (microscopic vessels)

- **One cell thick**
- **Serves the Respiratory System**

–Veins (draining channel)

ARTERIES

- ▶ Blood vessels that carry blood away from the heart are called arteries.
- ▶ They are the thickest blood vessels and they carry blood high in oxygen known as oxygenated blood (oxygen rich blood).



ARTERIES

- **Accompanied by vein and nerves**
- **Lumen is small**
- **No valves**
- **Repeated branching**

CLASSIFICATION OF ARTEIES

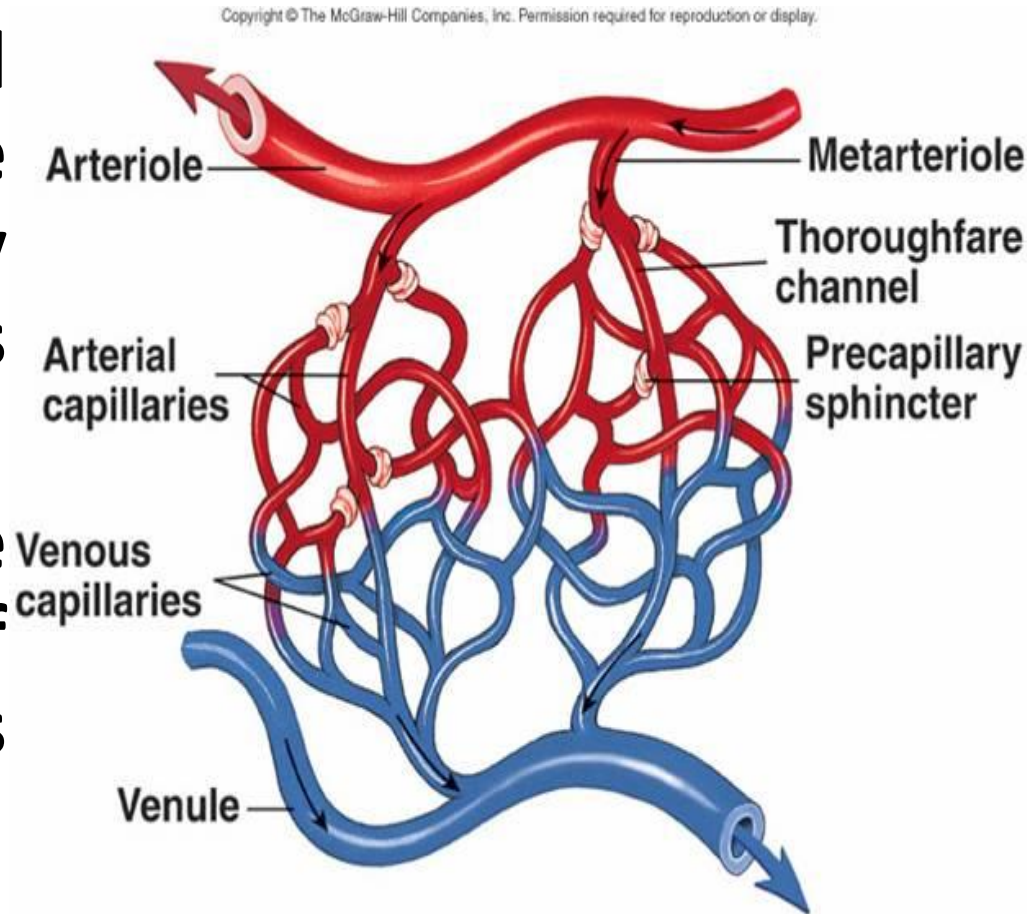
- **Elastic- e.g. (Aorta & its Major branches)**
- **Muscular -e.g.(Renal, Testicular, Radial, Tibial etc.)**
- **Arterioles-**

Terminal arterioles

Meta-arterioles

CAPILLARIES (5-8 micron)

- The smallest blood vessels are capillaries and they connect the arteries and veins.
- This is where the exchange of nutrients and gases occurs.



BODY CONTAINS TWO KINDS OF CAPILLARIES

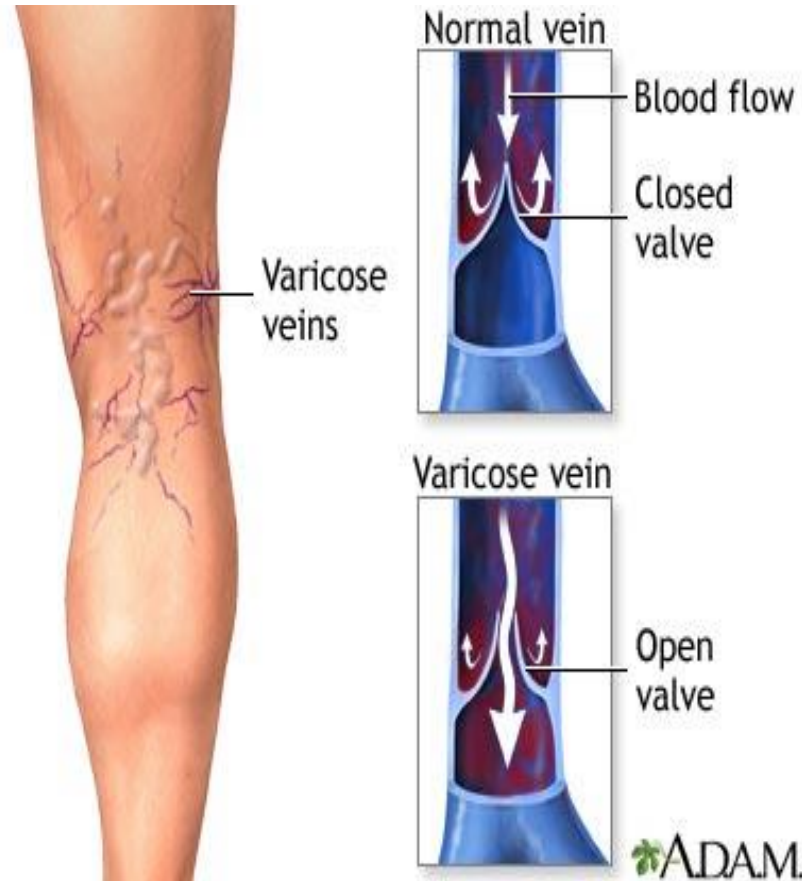
- **CONTINUOUS-SKIN, LUNG, SMOOTH MUSCLE, CONNECTIVE TISSUES**
- **FENESTRATED- PANCREAS, ENDOCRINE GLANDS, SMALL INTESTINE, CHOROID PLEXUS, CILIARY PROCESS etc.**

SINUSOIDS

- SINUSOIDS**- Large irregular vascular space eg. Liver, Spleen, Bone marrow, suprarenal, Parathyroid etc.

VEINS

- Blood vessels that carry blood back to the heart are called veins.
- They have one-way valves which prevent blood from flowing backwards.
- They carry blood that is high in carbon dioxide known as deoxygenated blood (oxygen poor blood).



VEINS

- Thin Walled
- Large irregular lumen
- Have valves
- Dead space around
- Types:

Large

Medium

Small

VEINS

- **Veins without valves:**
 - **SVC & IVC**
 - **Hepatic, Renal**
 - **Uterine, Ovarian not Testicular**
 - **Facial**
 - **Pulmonary**
 - **Umbilical**
 - **Emissary**
 - **Portal Veins**

VEINS

- **Veins without Muscular tissue:**
 - **Dural venous sinuses**
 - **Pial Veins**
 - **Retinal**
 - **Veins of erectile tissue of sex organs**
 - **Veins of spongy bones**

VEINS

- **Factors responsible for venous return:**

- 1. Muscle contraction**

- 2. Negative intrathoracic pressure**

- 3. Pulsation of arteries**

- 4. Gravity**

- 5. Valves**

ANASTOMOSIS

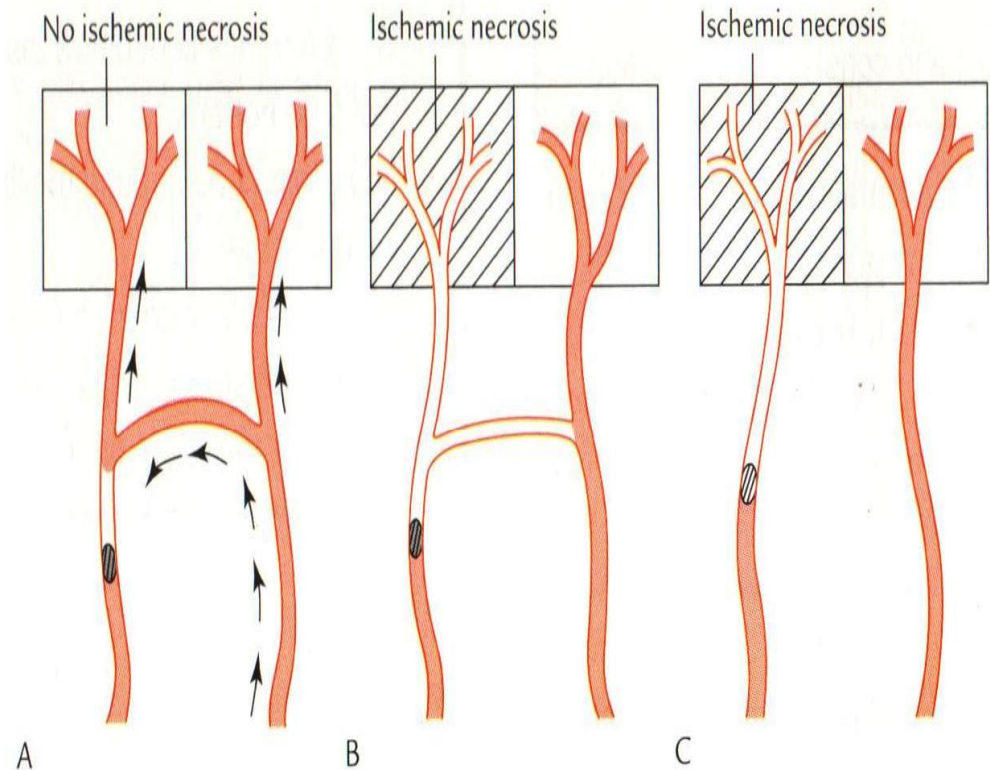
- Communication between vessels

- **ARTERIAL:**

Actual(end to end)-

Palmar, plantar, Circle of Willis, Labial Intestinal arcade, etc.

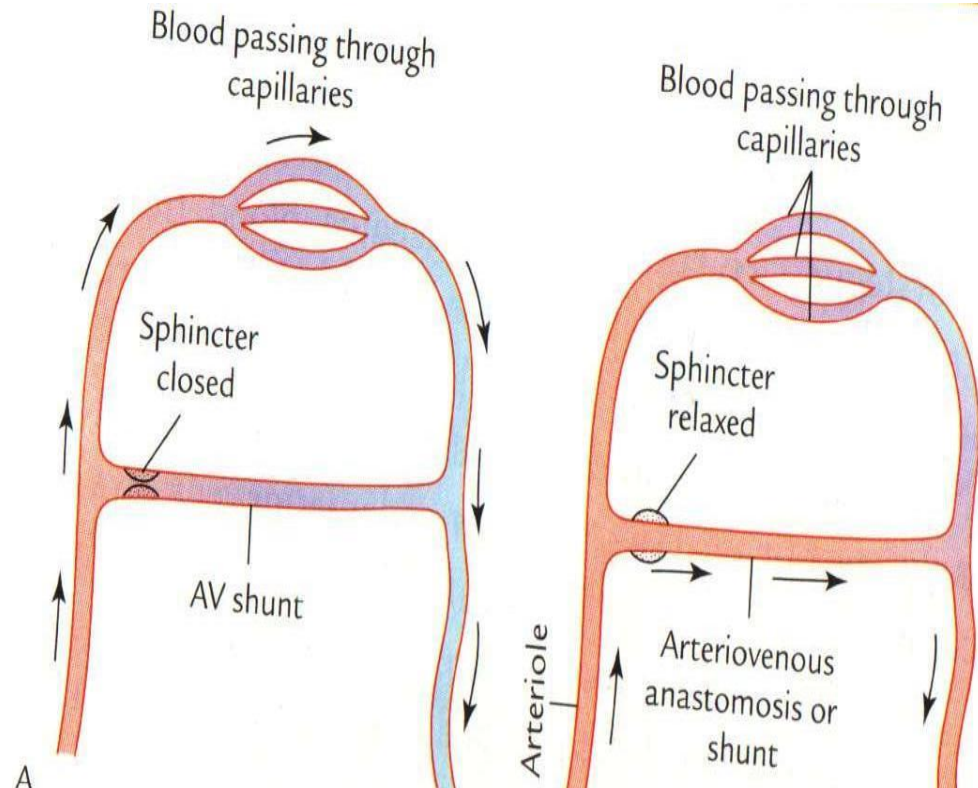
Potential-Coronary, around joints etc.



ANASTOMOSIS

- **ARTERIOVENOUS ANASTOMOSIS:**

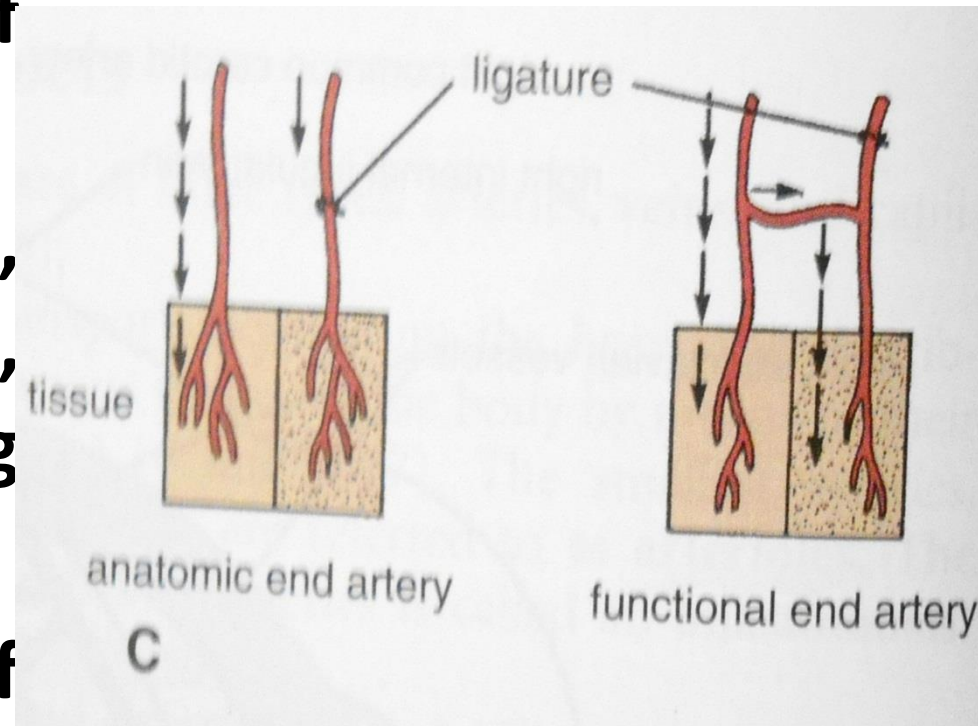
1. Skin of nose
2. Lips
3. External Ear
4. Mucus membrane of GI & nose
5. Erectile tissue of sex organ
6. Thyroid
7. Tongue



END ARTERIES

- **END ARTERIES:**

1. **Central artery of retina**
2. **Arteries of spleen, liver, kidneys, metaphyses of long bones**
3. **Central branches of cerebral cortex**



CIRCULATION

- Coronary circulation – the circulation of blood within the heart.**
- Pulmonary circulation – the flow of blood between the heart and lungs.**
- Systemic circulation – the flow of blood between the heart and the cells of the body.**
- Fetal Circulation**

SYSTEMIC AND PULMONARY CIRCULATION

Pulmonary circulation

The flow of blood between the heart and lungs.

Systemic circulation

The flow of blood between the heart and the cells of the body.

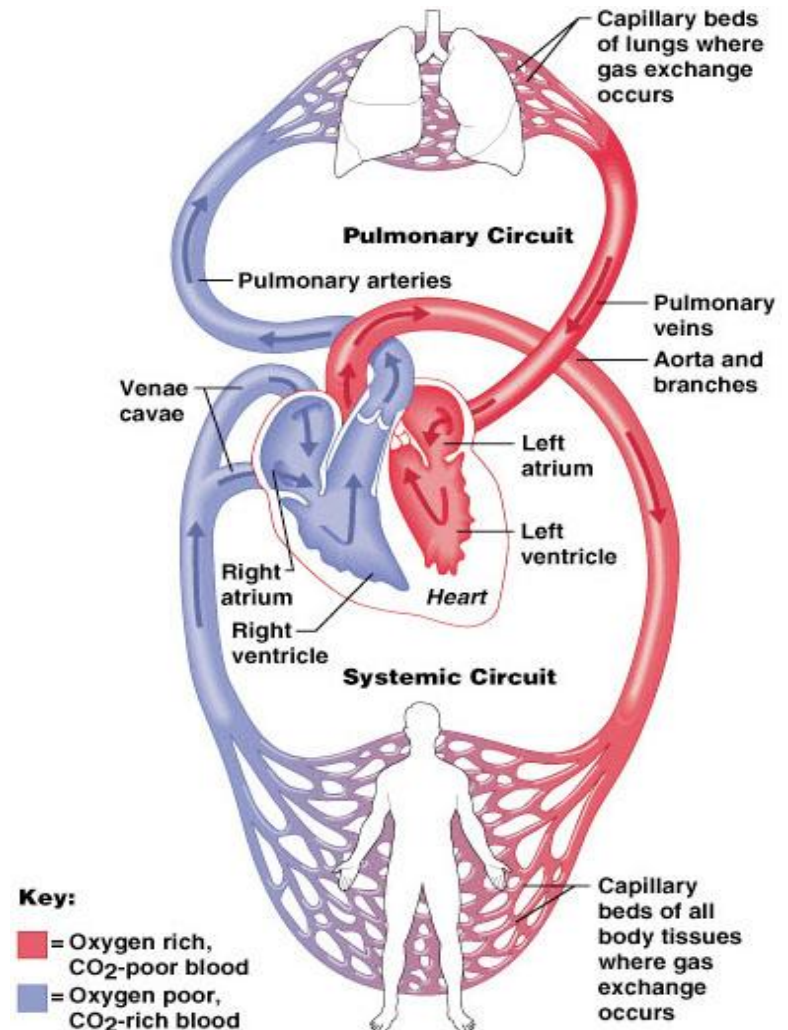
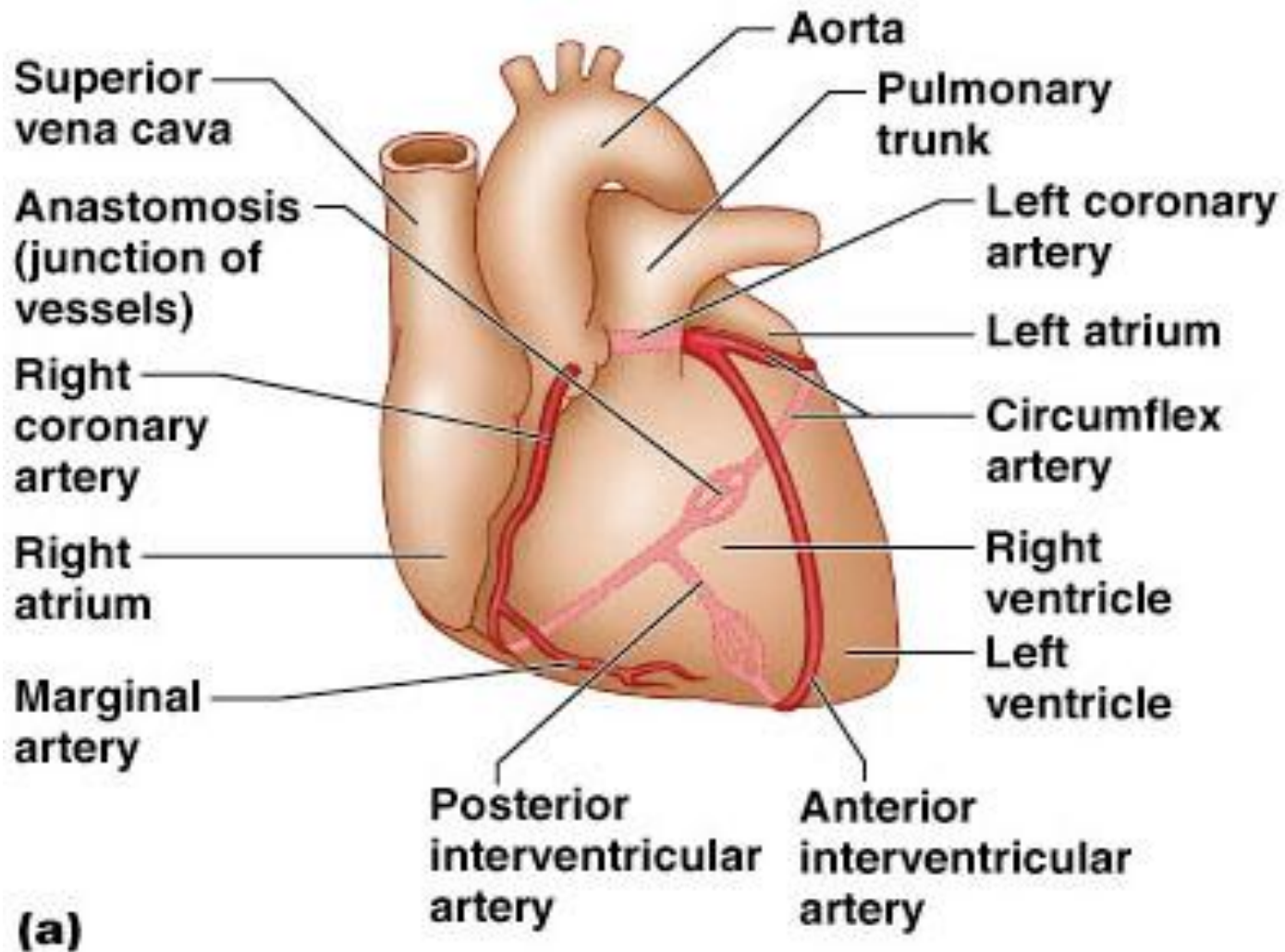


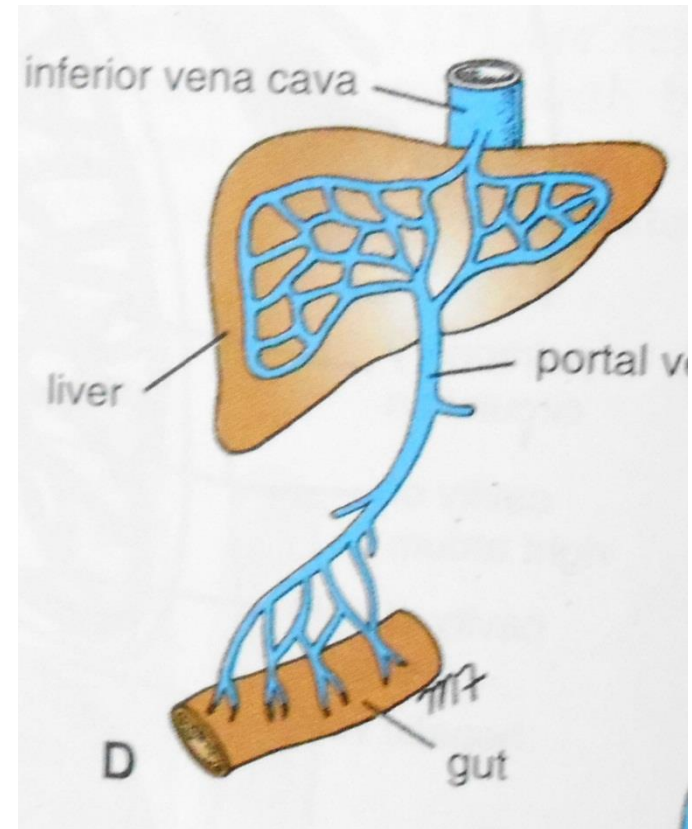
Figure 18.5
26

CORONARY CIRCULATION: ARTERIAL SUPPLY

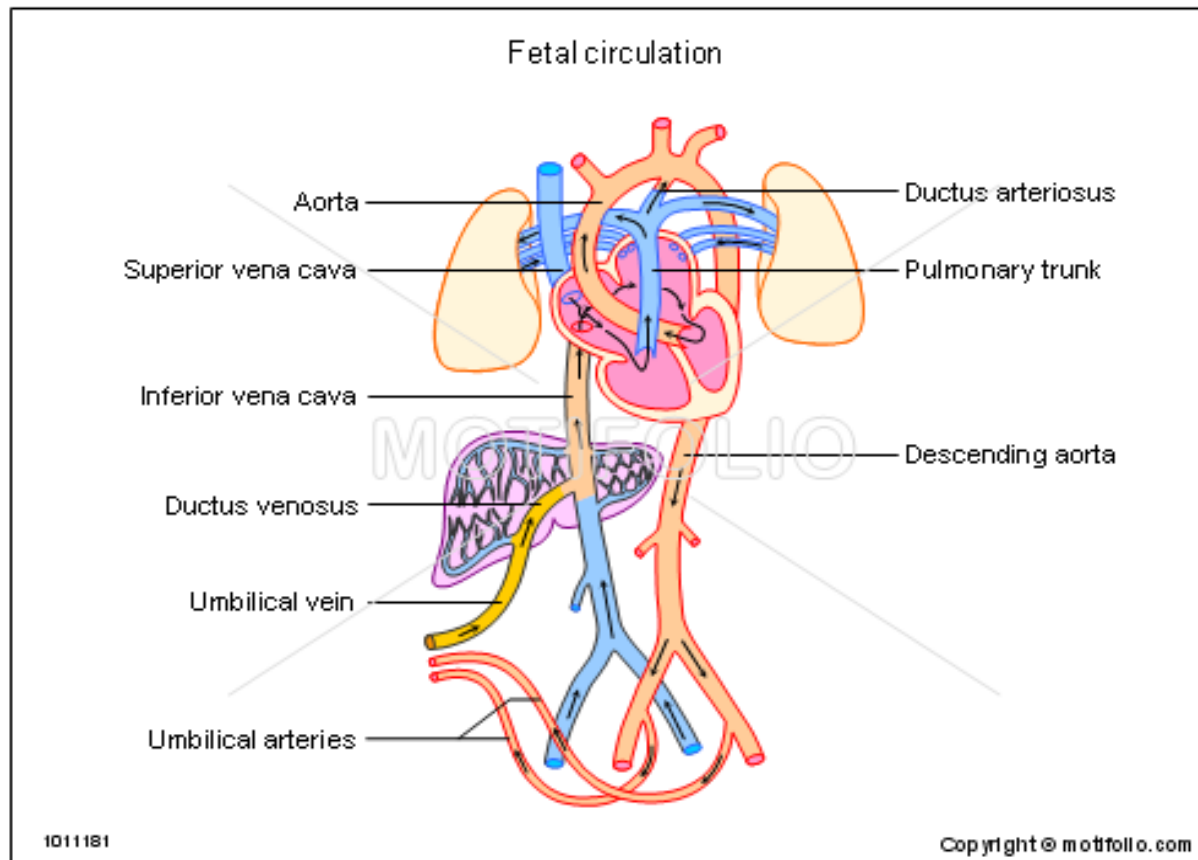


PORTAL CIRCULATION

►Portal circulation - the flow of blood between two sets of capillaries before draining in systemic veins.

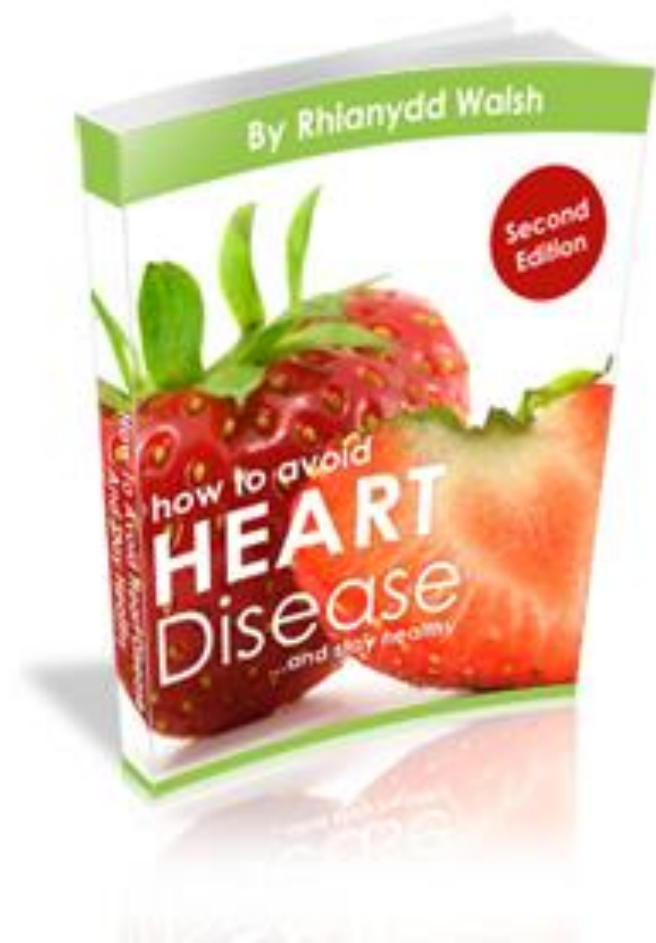


FETAL CIRCULATION



APPLIED

- Problems with the cardiovascular system are common, but they don't just affect older people.
- Many heart problems affect children and teenagers.





THANK YOU

QUESTIONS

1-All of the following are the example of elastic arteries except:

a)Aorta

b)Common carotid artery

c)Subclavian artery

d)Radial artery

QUESTIONS

2-All of the following are the example of end arteries except:

- a)Central branches of cerebral arteries**
- b)Central artery of retina**
- c)Facial artery**
- d)Splenic artery**

QUESTIONS

3-Arteriovenous anastomosis are found at all of the following sites except:

- a)Skin of lips**
- b)Erectile tissue of penis**
- c)Thyroid gland**
- d)Liver**

QUESTIONS

4-All of the following are the example of portal circulation except:

a)Hepatic circulation

b)Renal circulation

c)Circulation of hypophysis cerebri

d)Pulmonary circulation

QUESTIONS

5-All of the following are features of veins except:

a)Thin walls

b)Thin tunica media

c)Thin tunica adventia

d)Wide lumen

REFERENCES

- 1- General Anatomy by Vishram Singh**
- 2- Clinical Anatomy by R. Snell**
- 3-Gray's Anatomy**