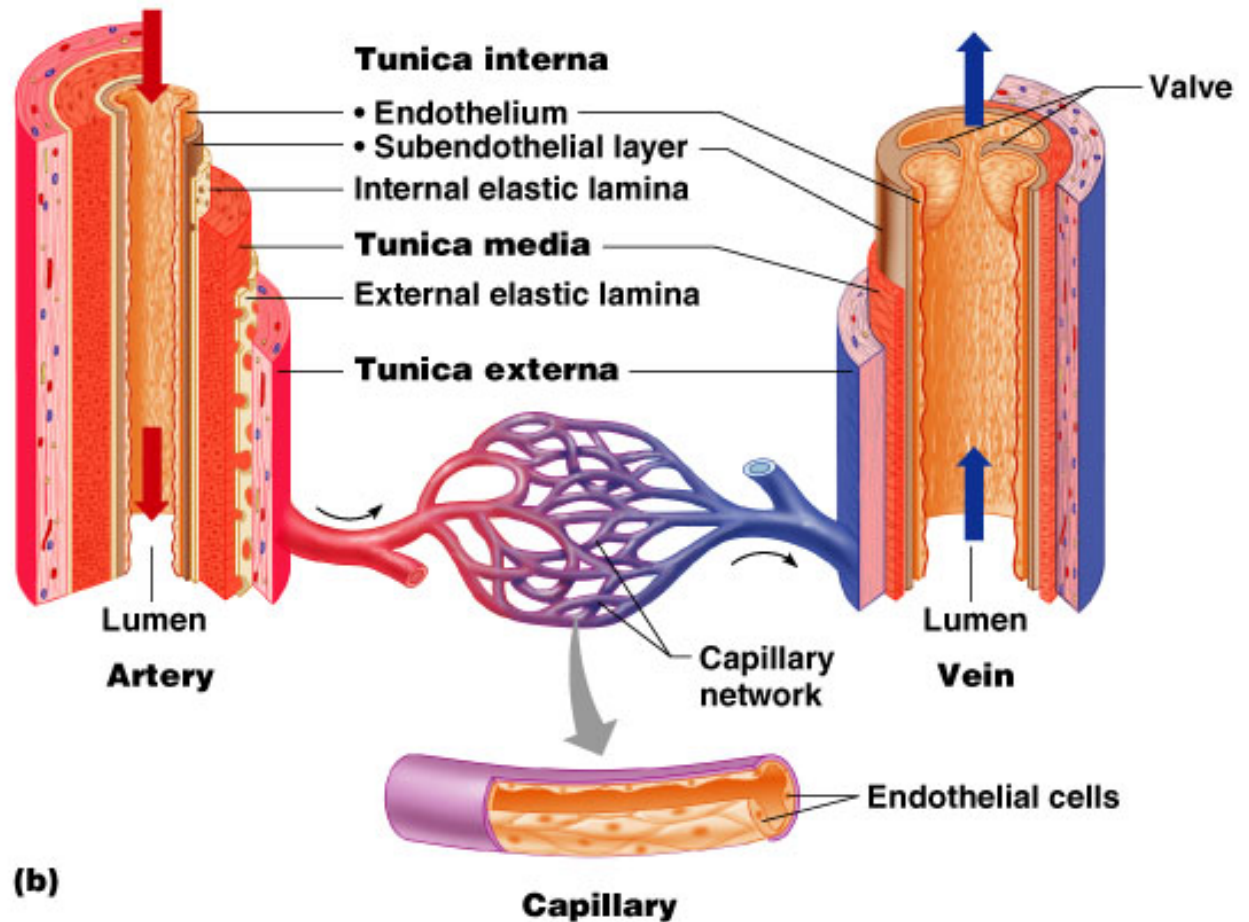
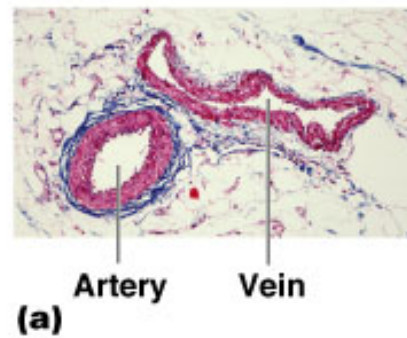


Circulatory System

Exercise 32



Structure of Artery and Vein



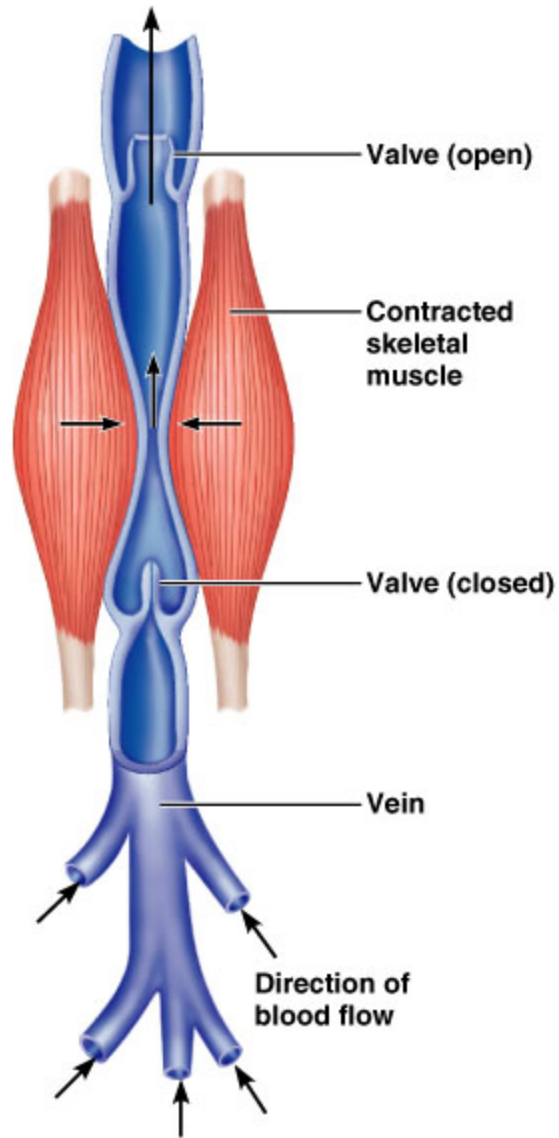
Structure of blood vessels

- Tunica externa
 - Outermost layer of connective tissue
- Tunica media
 - Middle layer of smooth muscle
 - Relax to vasodilate, contract to vasoconstrict
- Tunica interna
 - Innermost layer of simple squamous endothelial cells

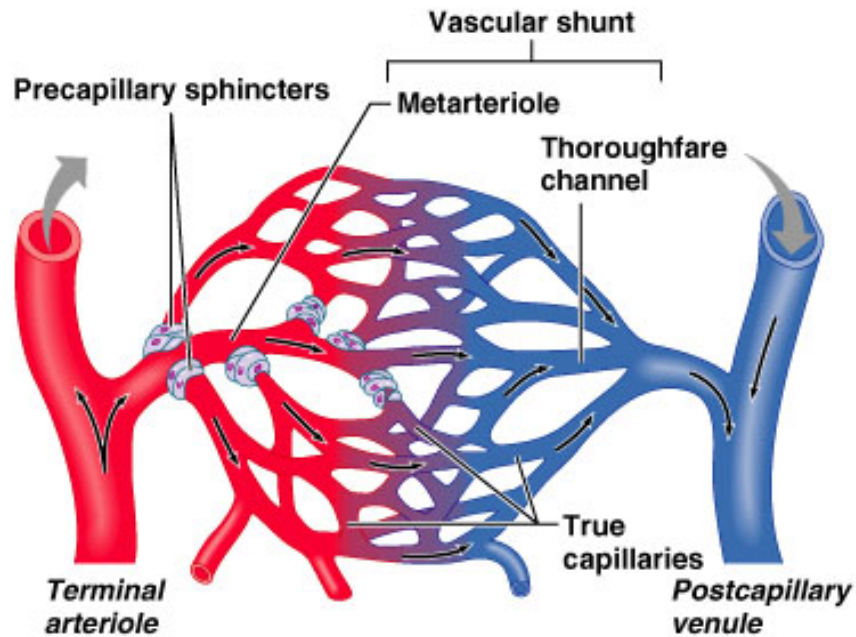
Arteries vs Veins

- Arteries: thicker tunica media
- Arteries: elastic layer to expand
- Veins: valves to prevent backflow
- Veins: larger lumen to hold more blood
 - Blood reservoir

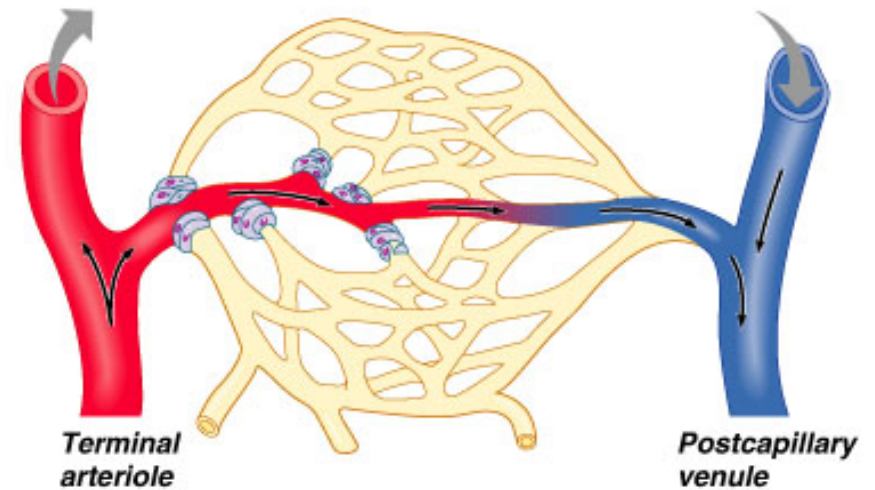
Venous valves



Capillary Bed



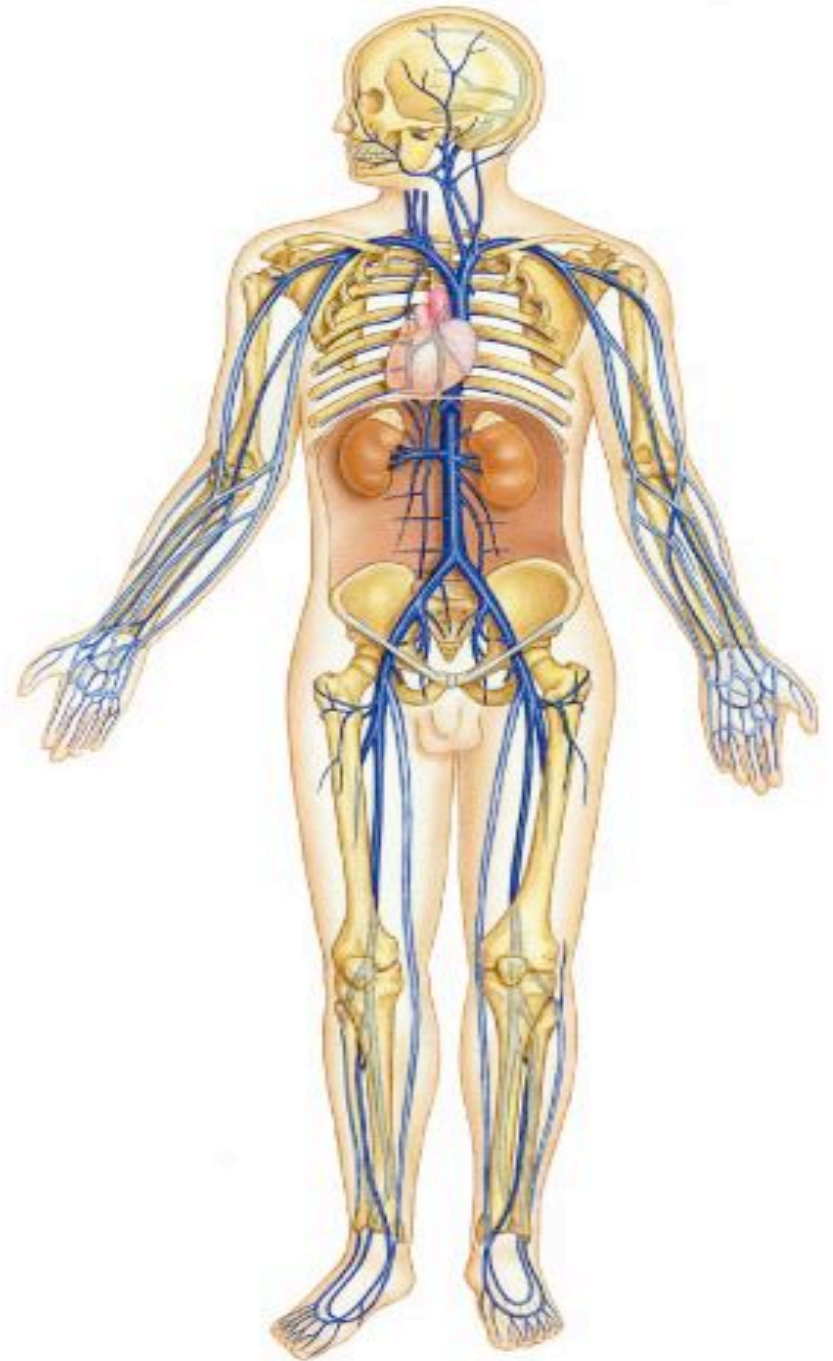
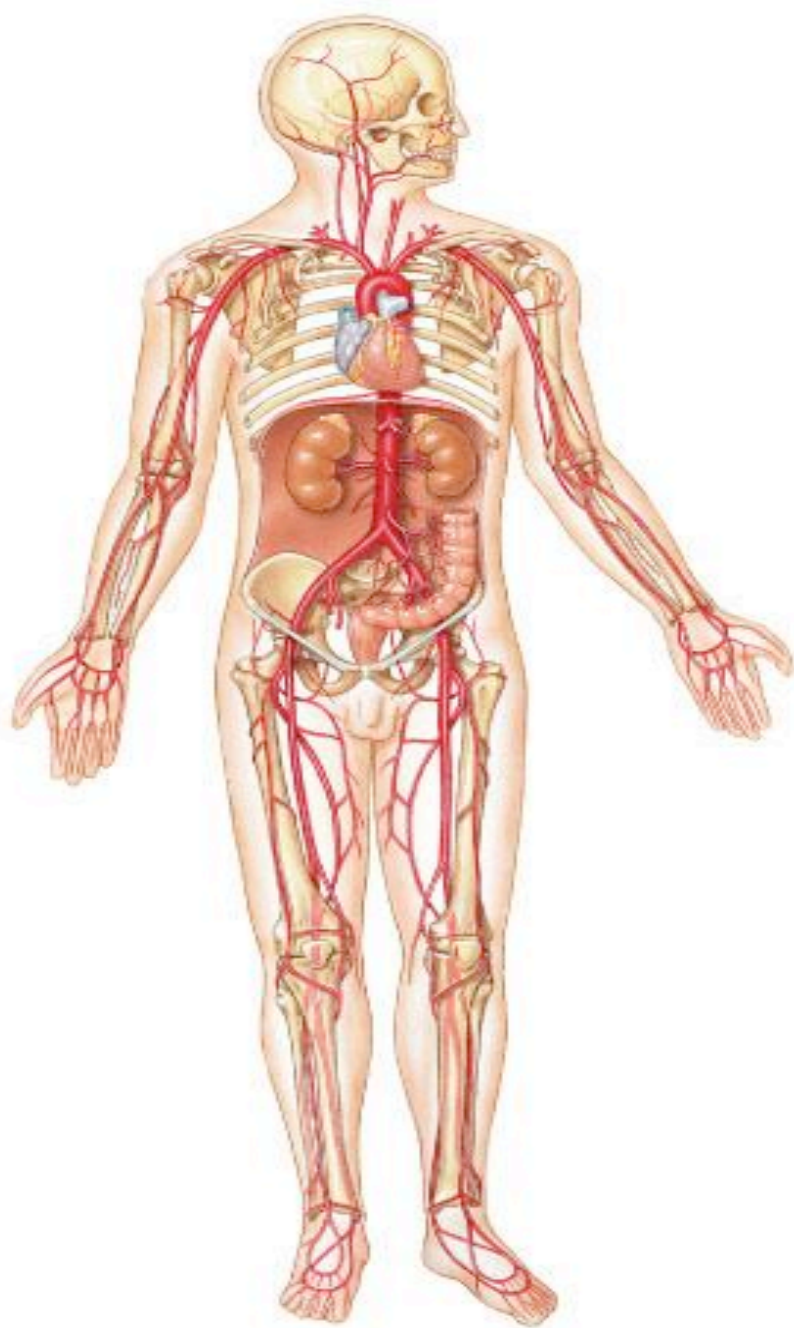
(a) Sphincters open



(b) Sphincters closed

Capillaries

- Thin layer of endothelial cells
 - Small passageways called fenestrations
 - Filtration is movement out of vessel
 - Reabsorption is movement into vessel
- Precapillary sphincters control flow
- Bypass a capillary bed with anastomosis (es)



3 unique circulatory systems

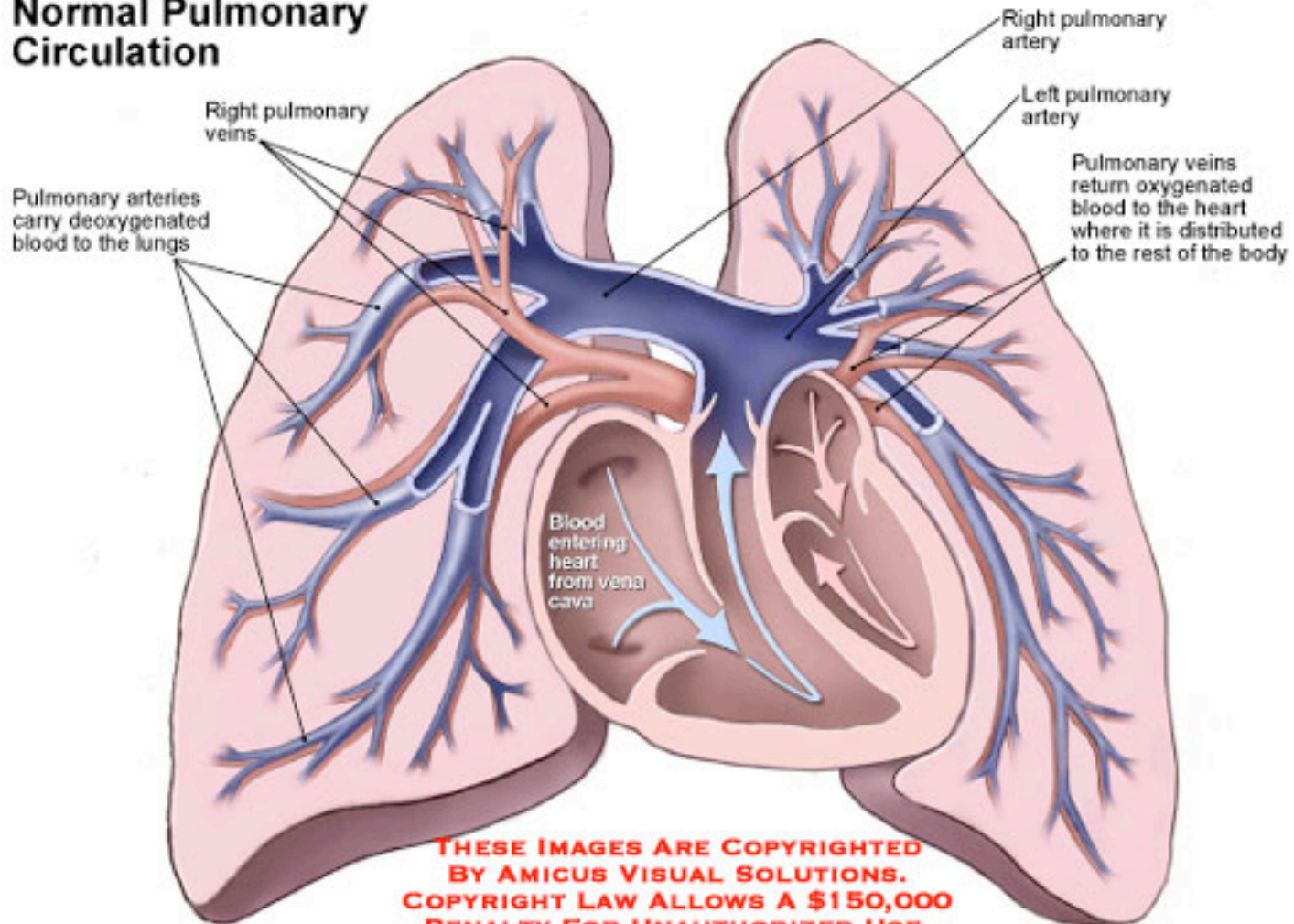
1. Pulmonary system to lungs

- Recall arteries are blue and take blood away from heart
- Veins are red and take blood to the heart

2. Hepatic portal circulation

- Blood flows from digestive system directly to liver instead of the heart
- Remove toxins and store glucose in liver

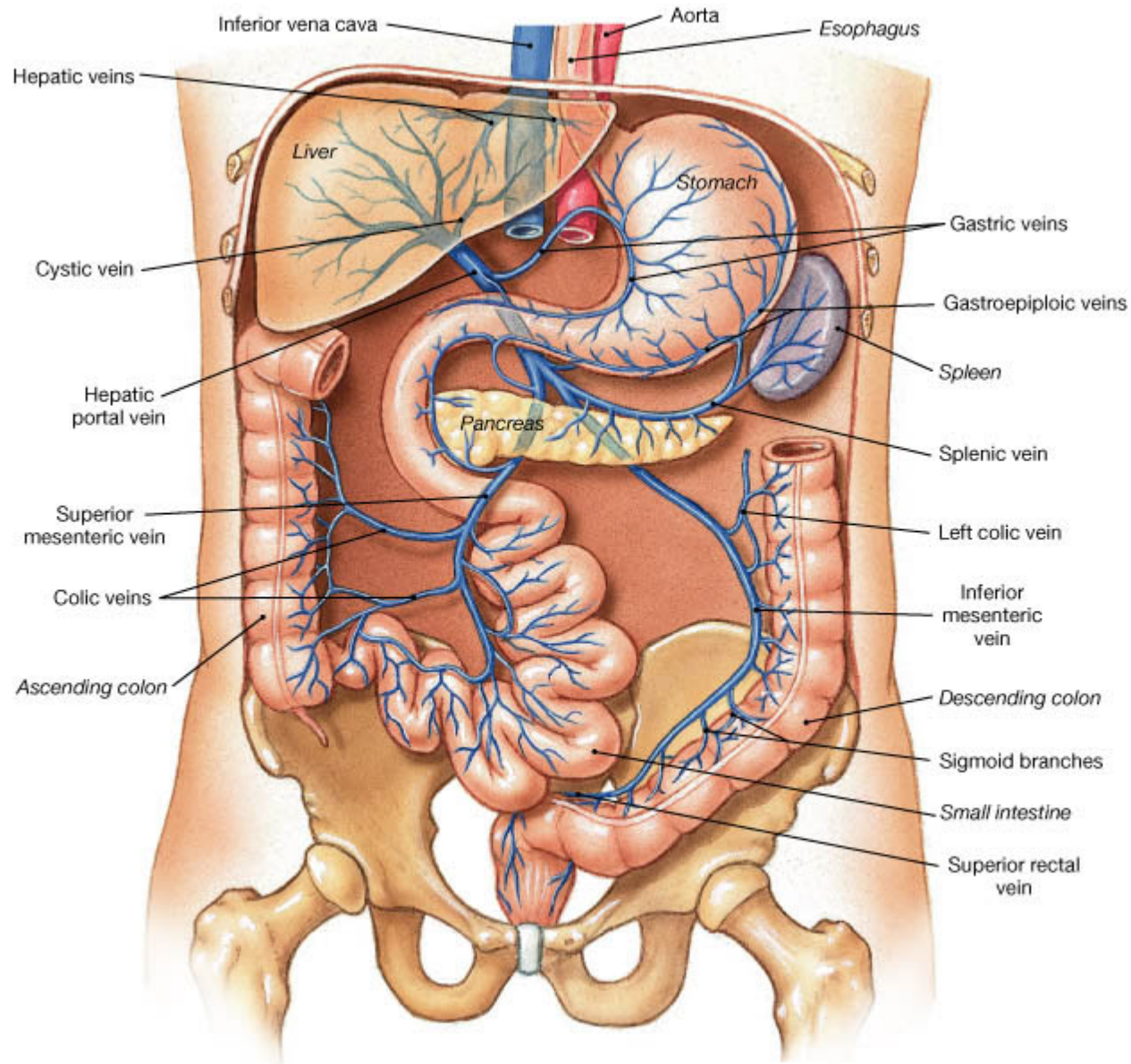
Normal Pulmonary Circulation



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Hepatic Portal Circulation



Hepatic Portal Circulation

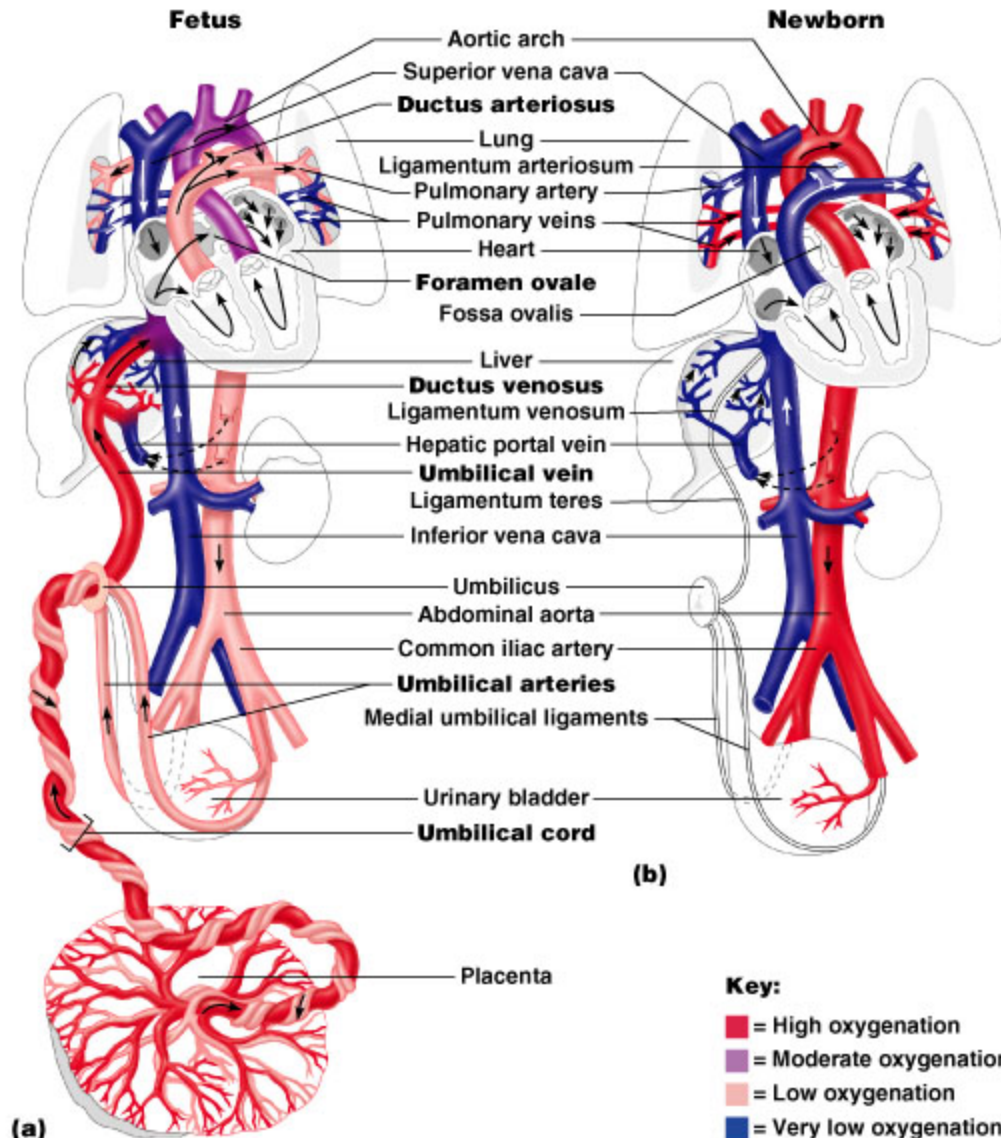
Hepatic Portal Vein

- Formed by union of **superior mesenteric vein** and **splenic vein** (**inferior mesenteric vein** joins splenic vein)
- Carries nutrient rich blood to liver from GIT
- Blood is filtered of excess nutrients in liver and then rejoins the circulation via **hepatic vein**
- **Hepatic artery** carries oxygen rich blood to liver

3. Fetal circulation

- Different because no breathing or eating
- Placenta gives exchange between mother/fetus
 - 2 umbilical arteries (blood away from fetal heart)
 - Dark, unoxygenated blood (not the usual bright red)
 - 1 umbilical vein (blood towards fetal heart)
 - Bright red, oxygenated blood

Fetal Circulatory System



Fetal circulatory bypasses

- Foramen ovale to bypass lungs (no breathing)
 - Hole between right and left atria
 - After birth, closes to become fossa ovalis
- Ductus arteriosus also to bypass lungs
 - Connects pulmonary arch to aorta
 - Becomes ligamentum arteriosum