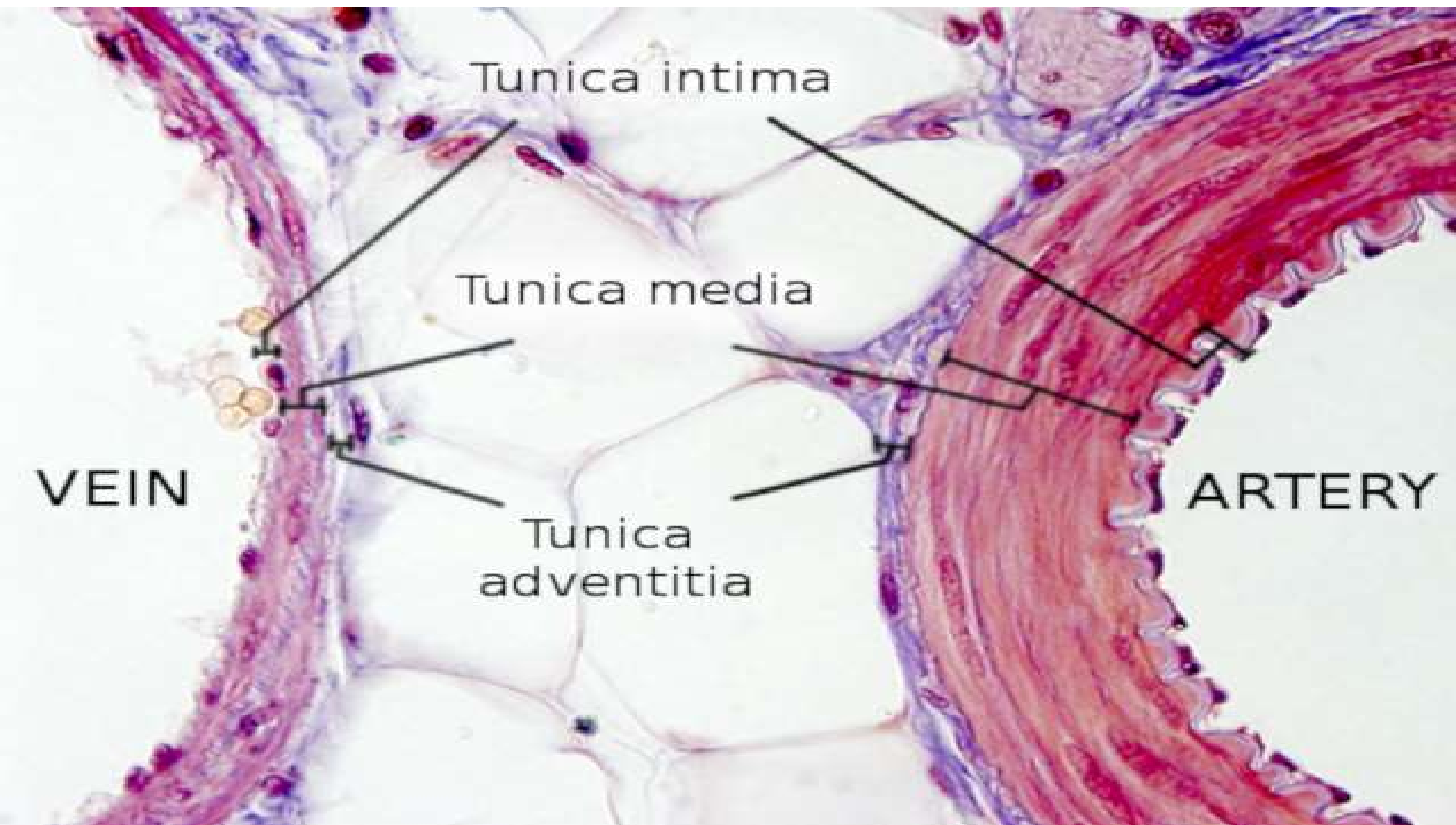


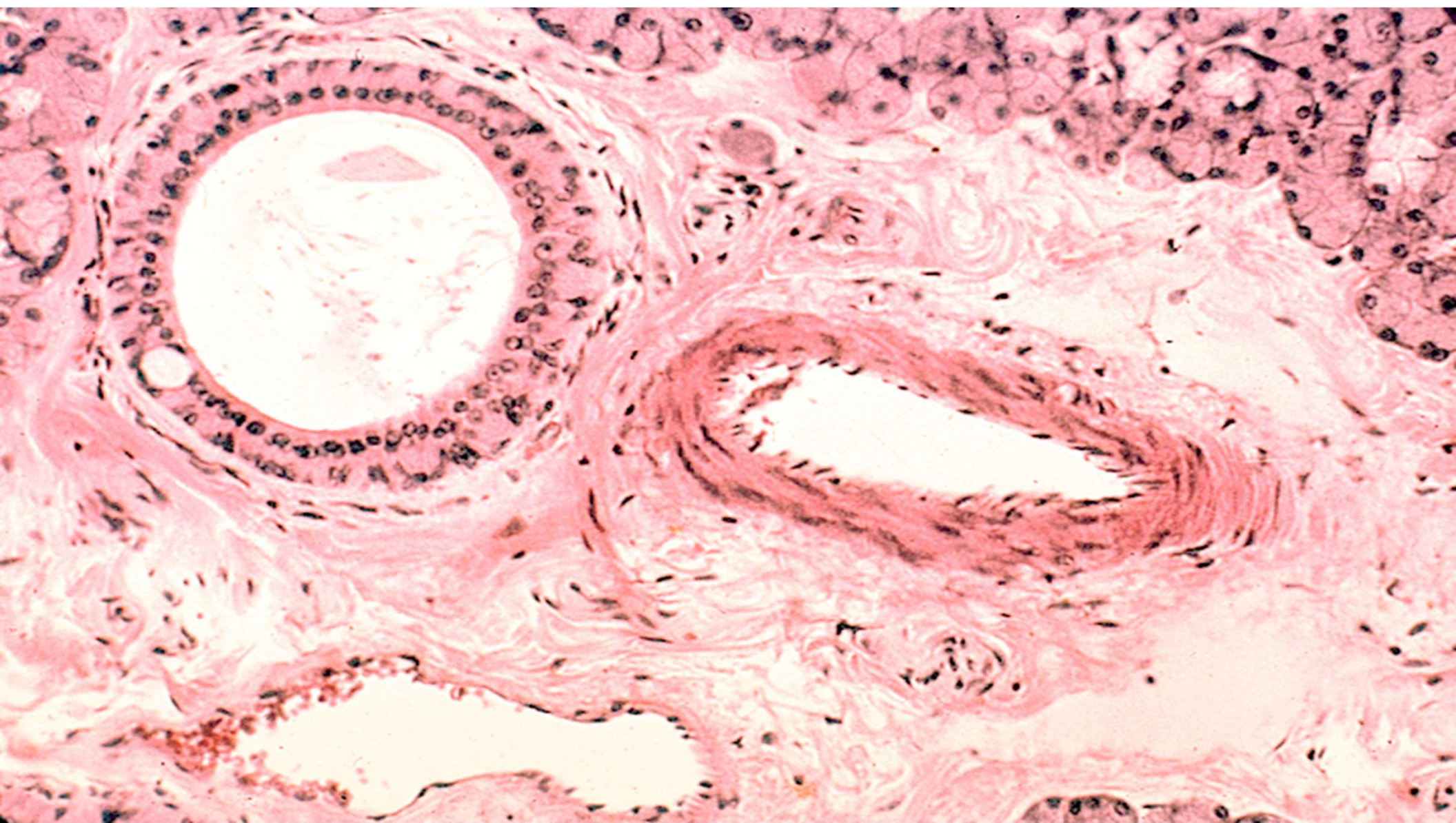


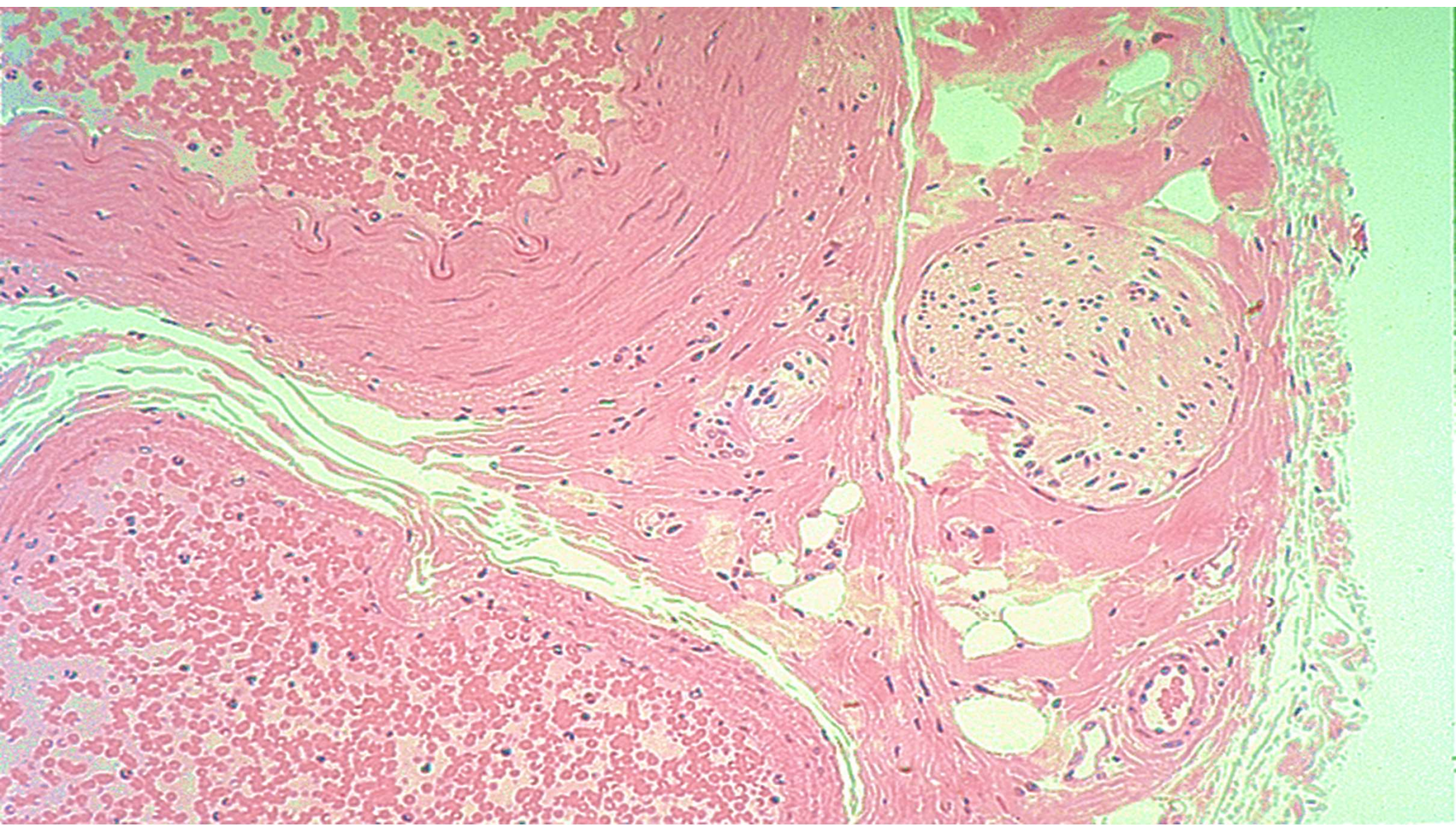
The vascularization

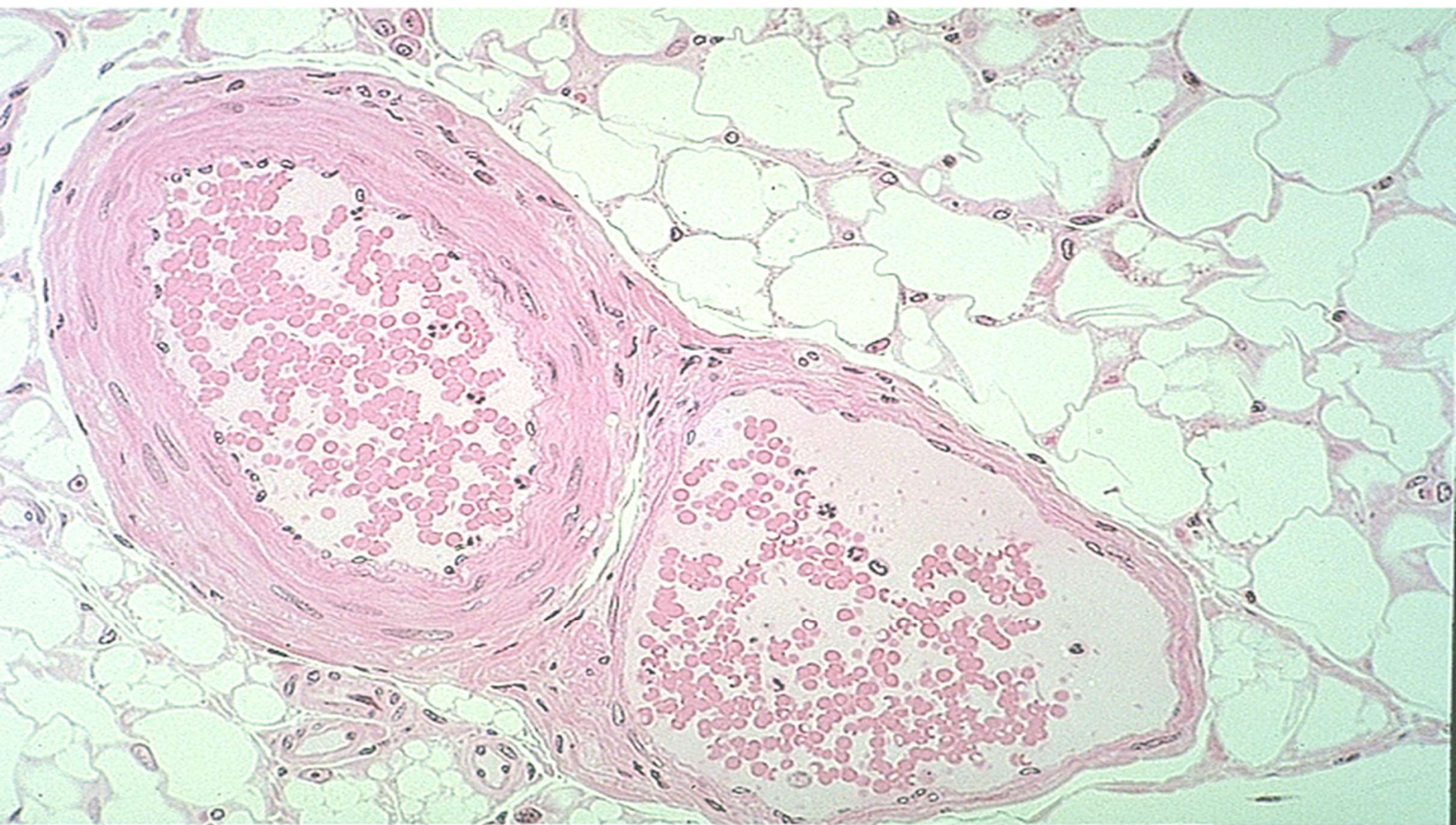
D.HAMMOUDI, MD

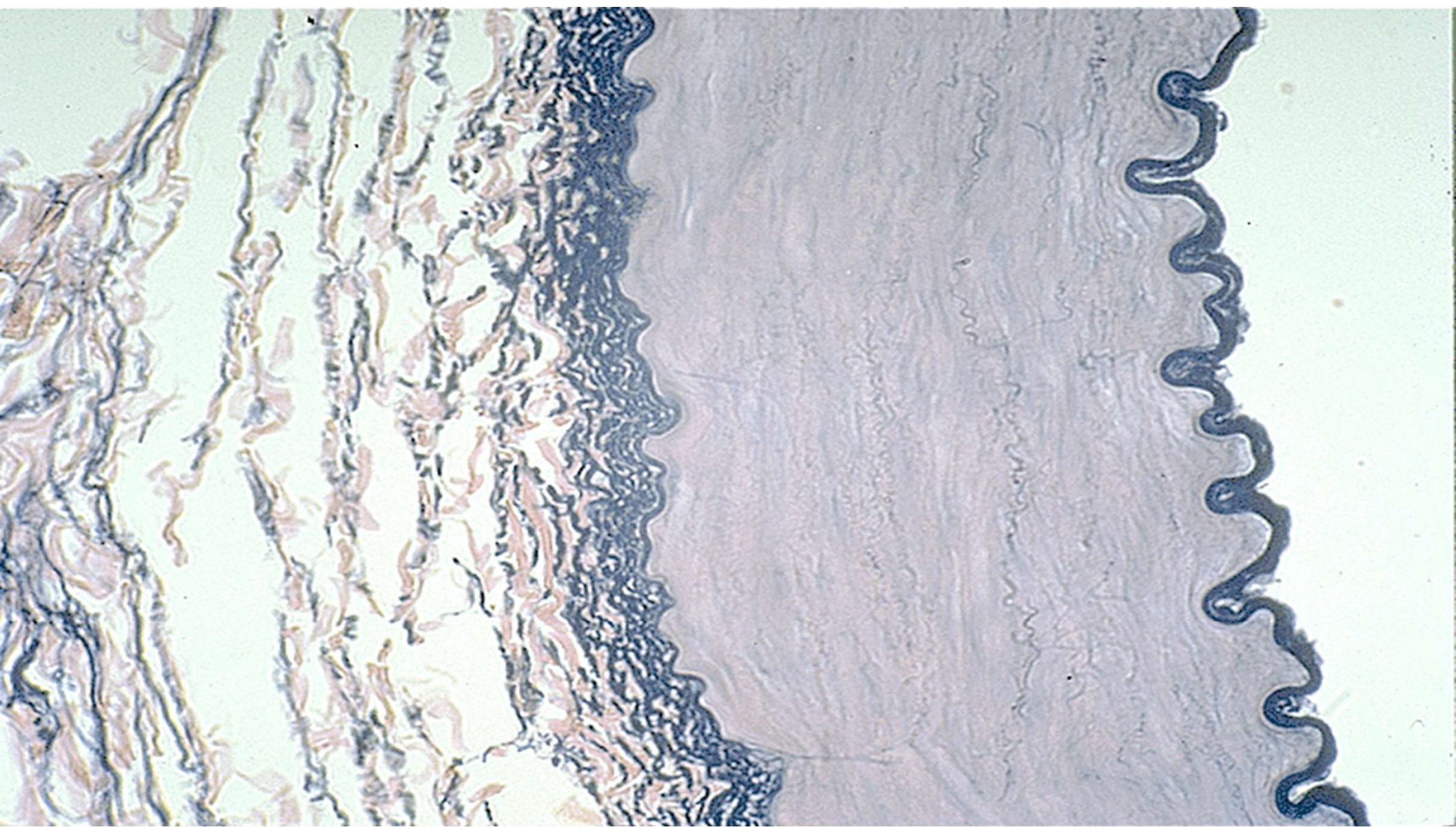
Blood Vessel Histology









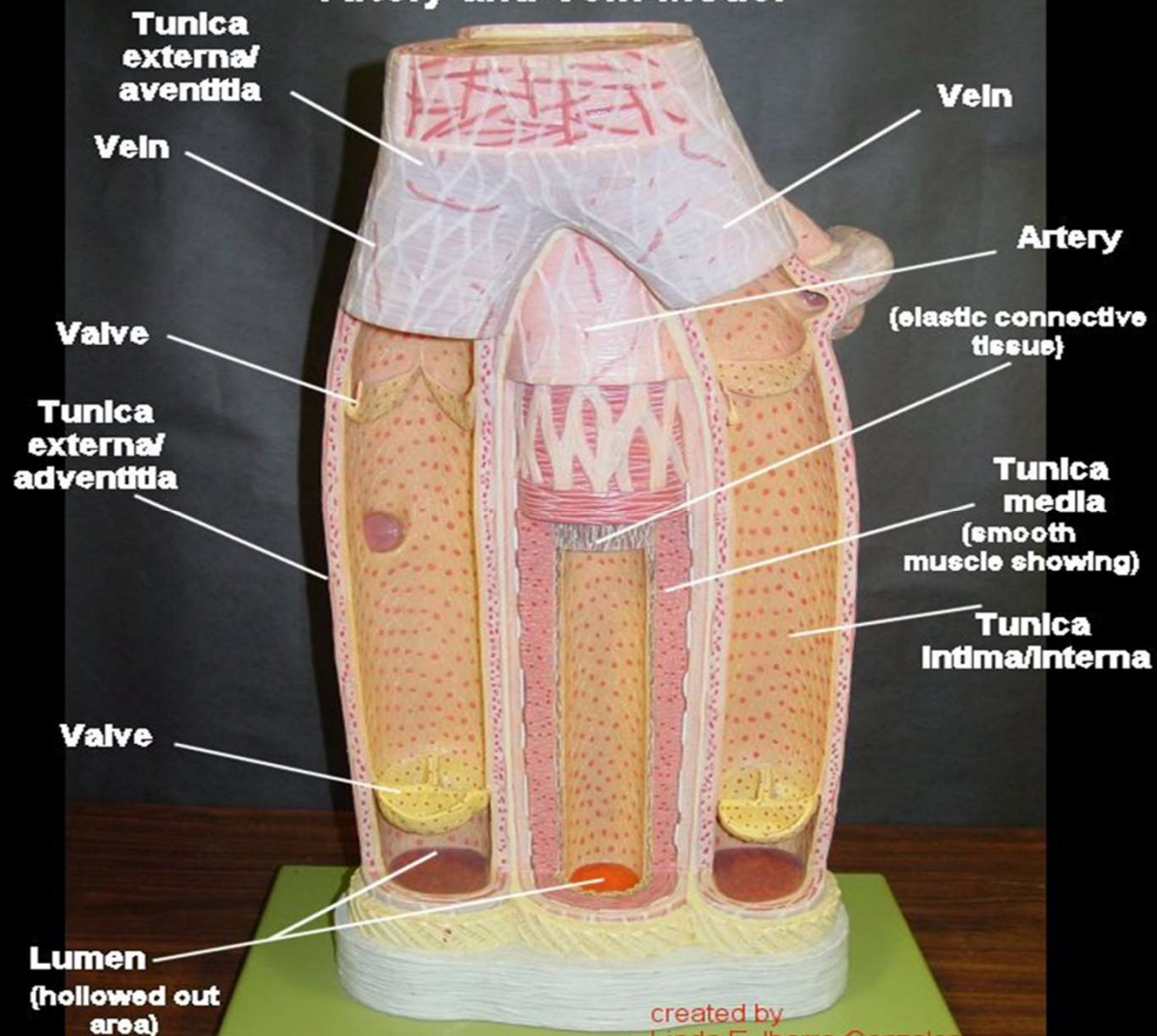




created by
Linda E. Ibarra-Gonzales

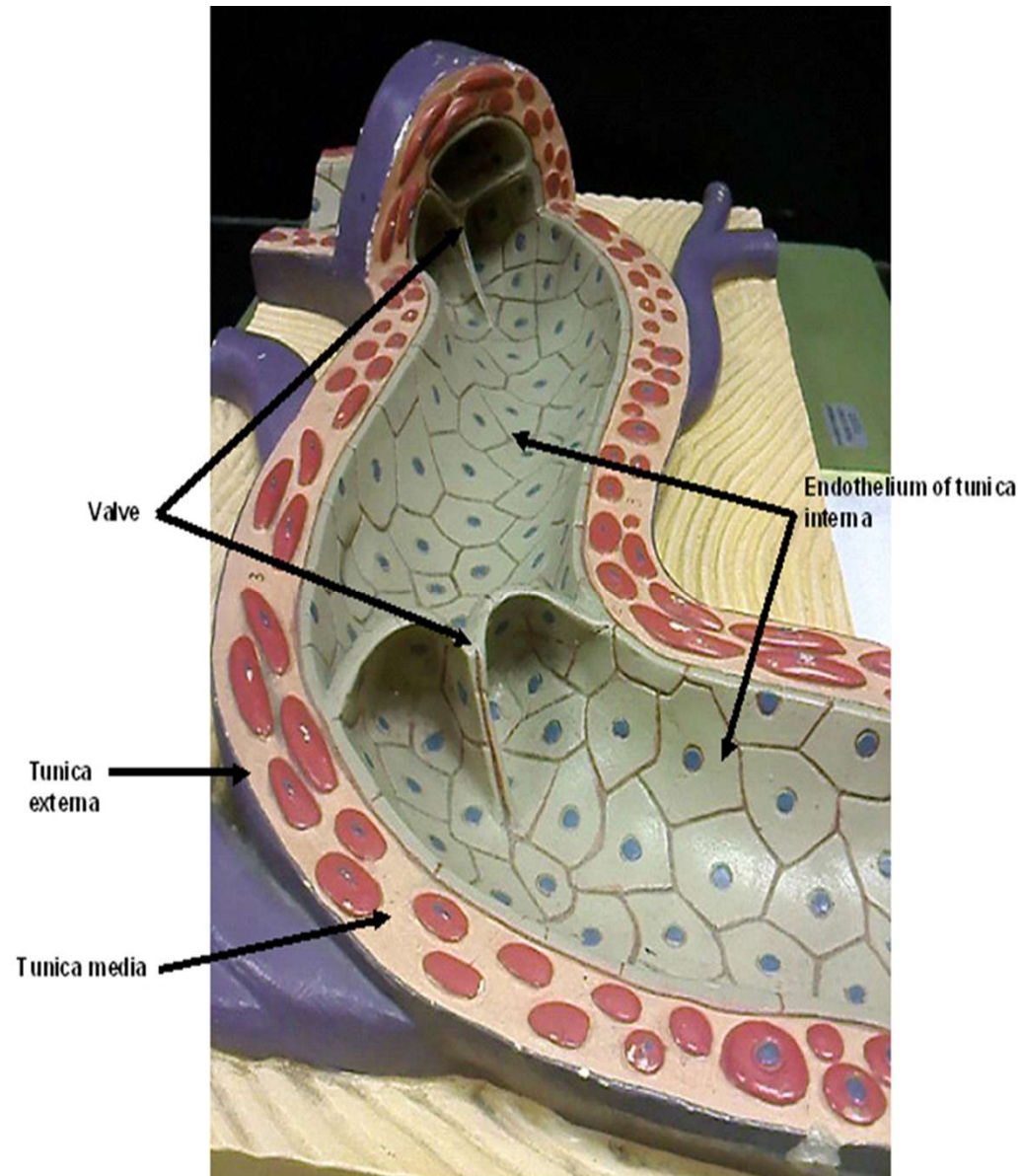
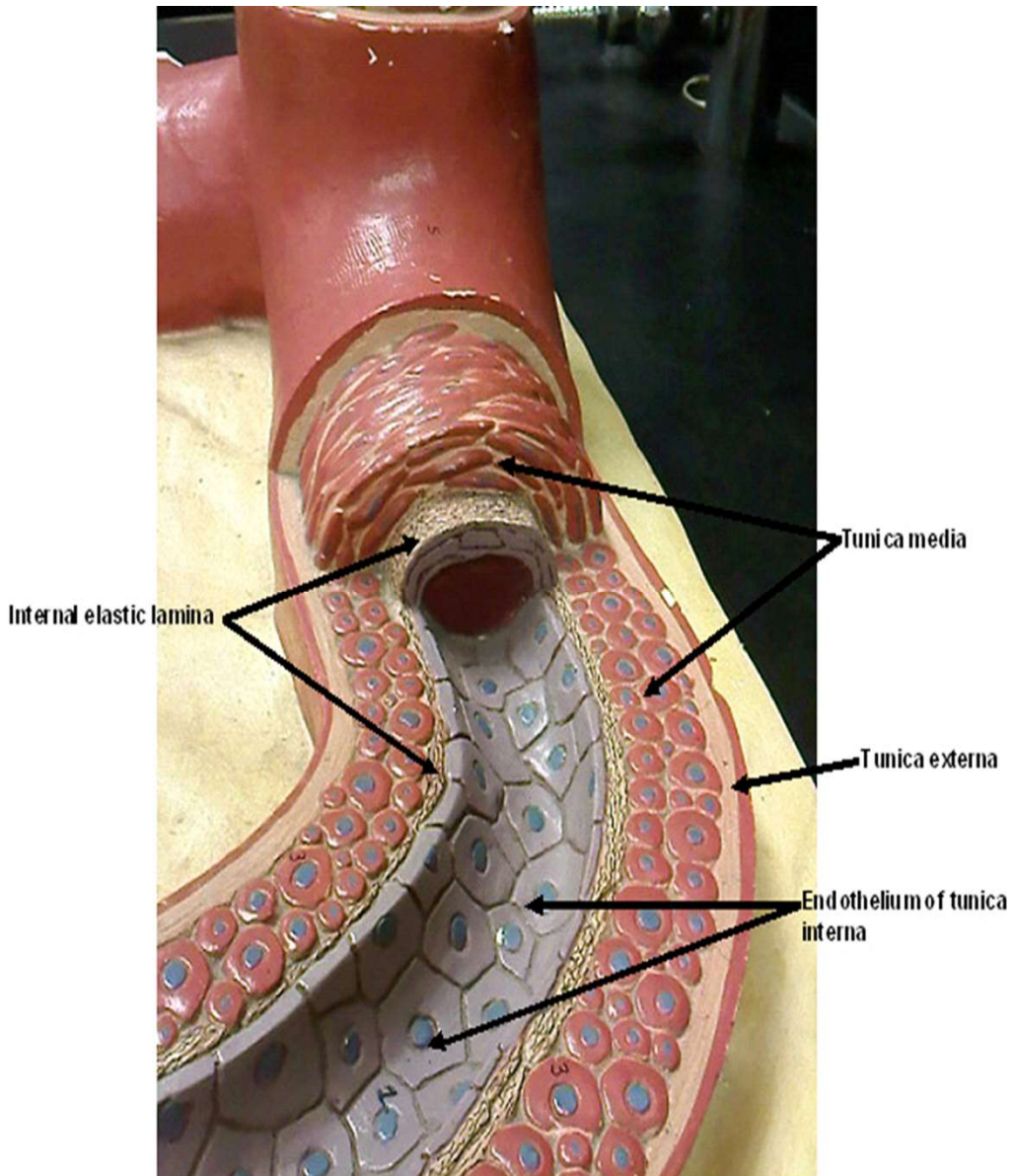
NO KEY TO MODEL

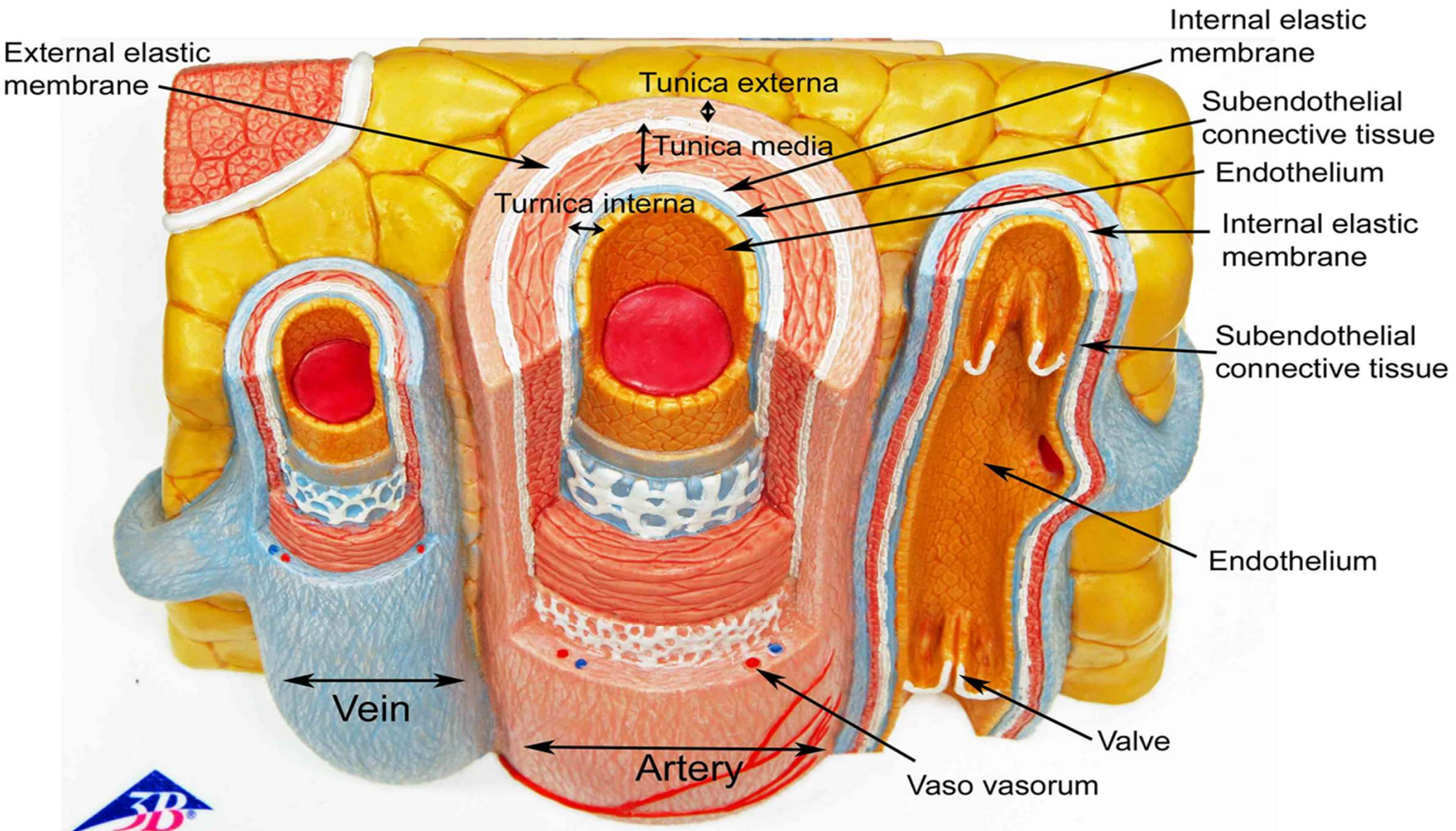
Artery and Vein Model



created by
Linda E. Ibarra-Gonzales

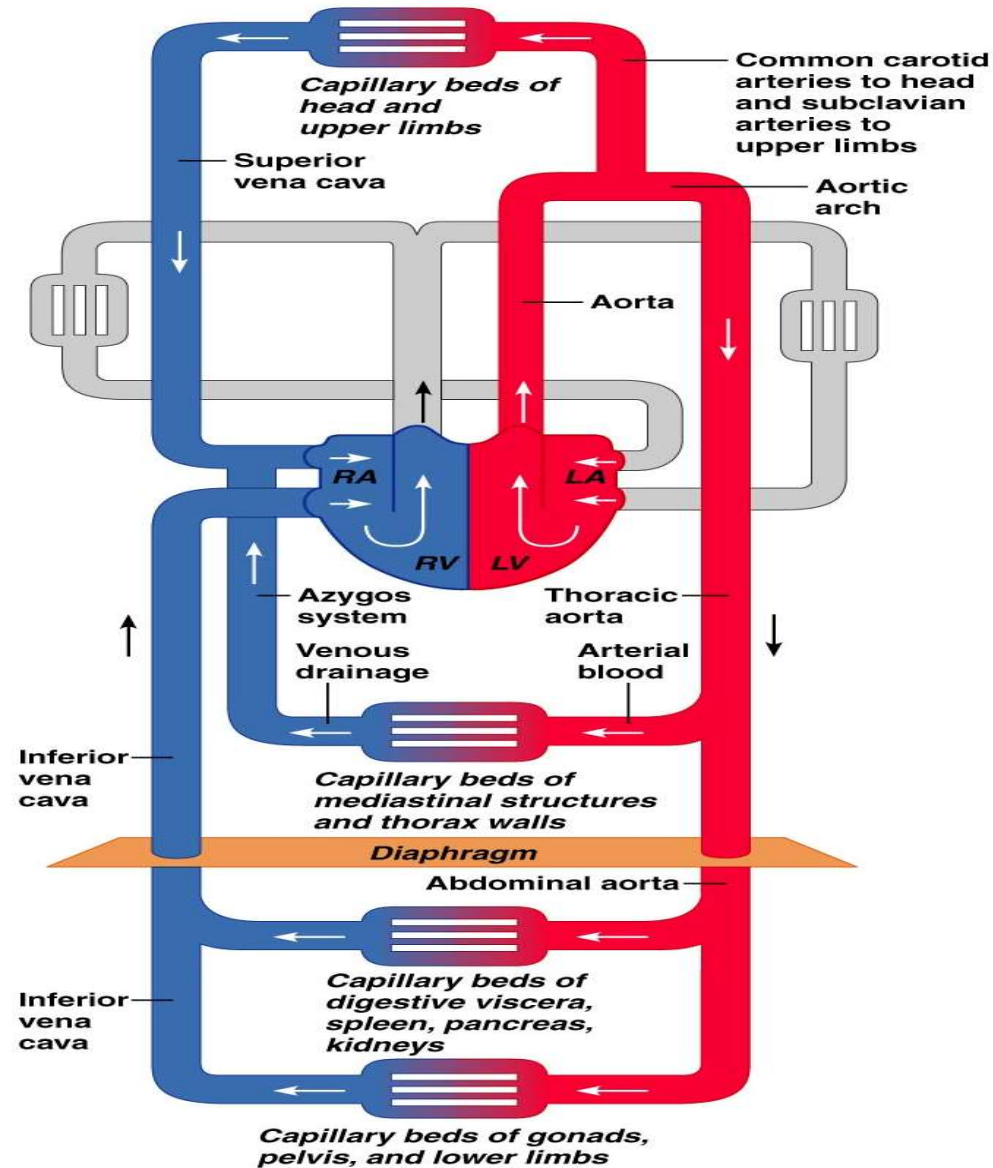
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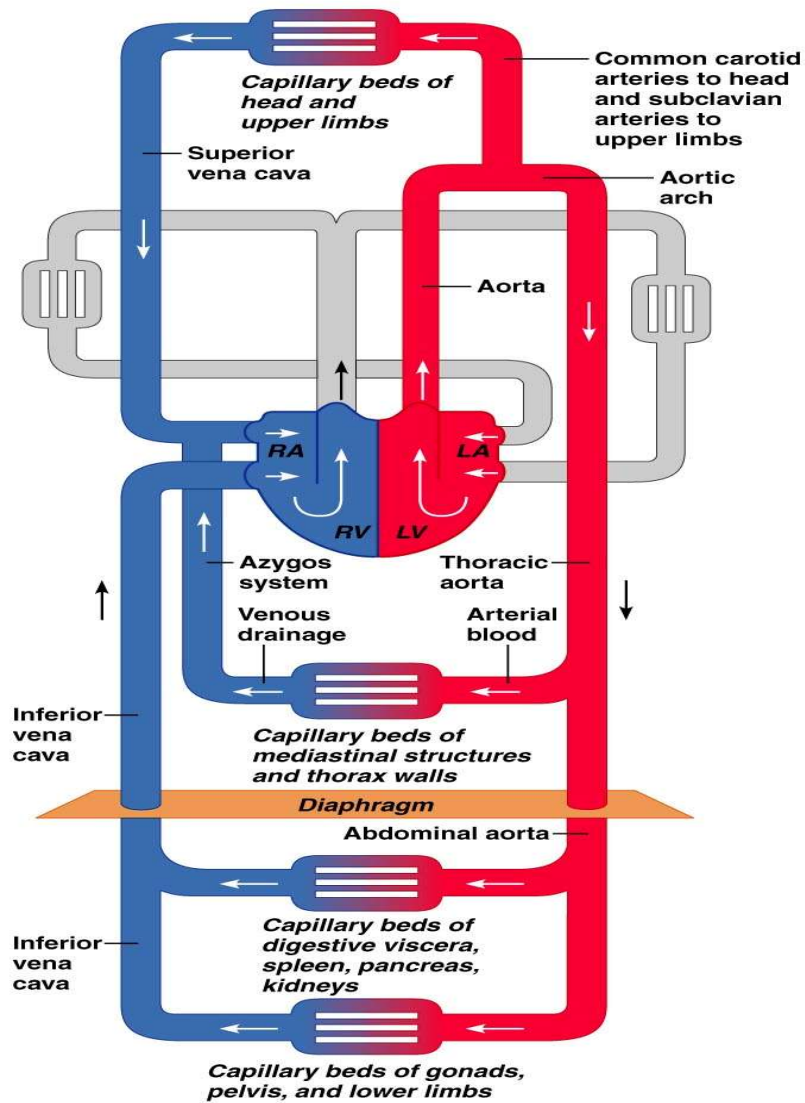




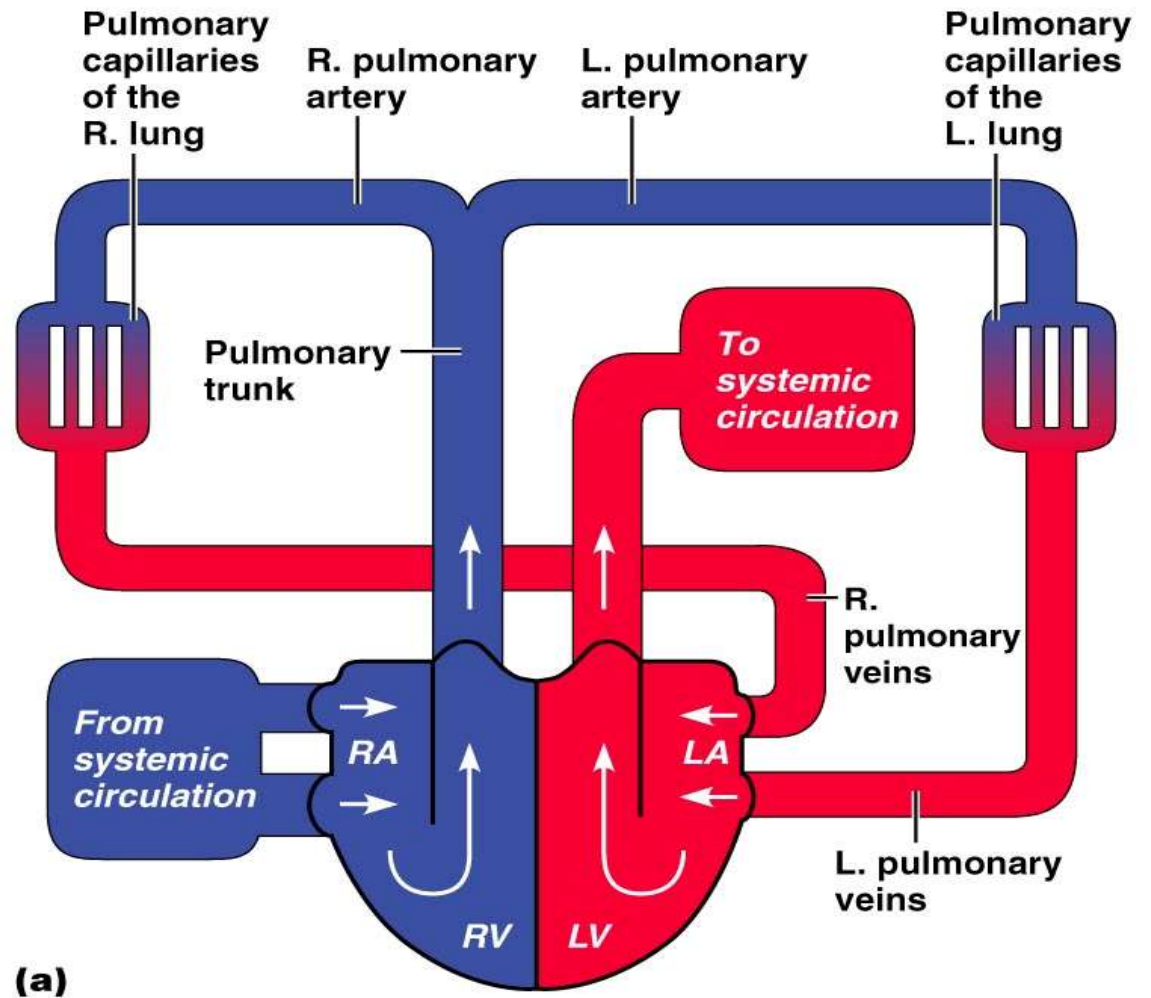
General Vascularization

Systemic Circulation





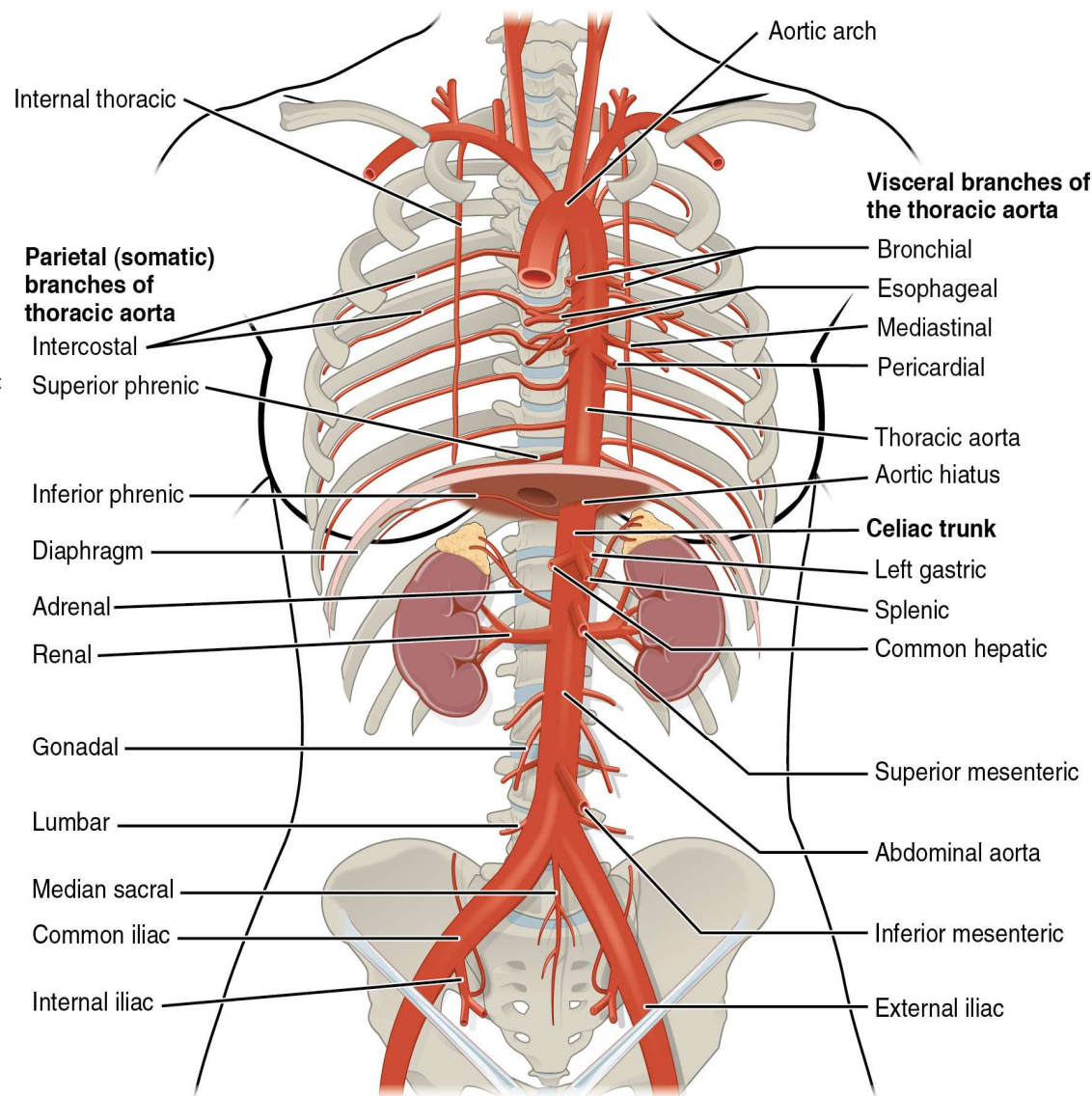
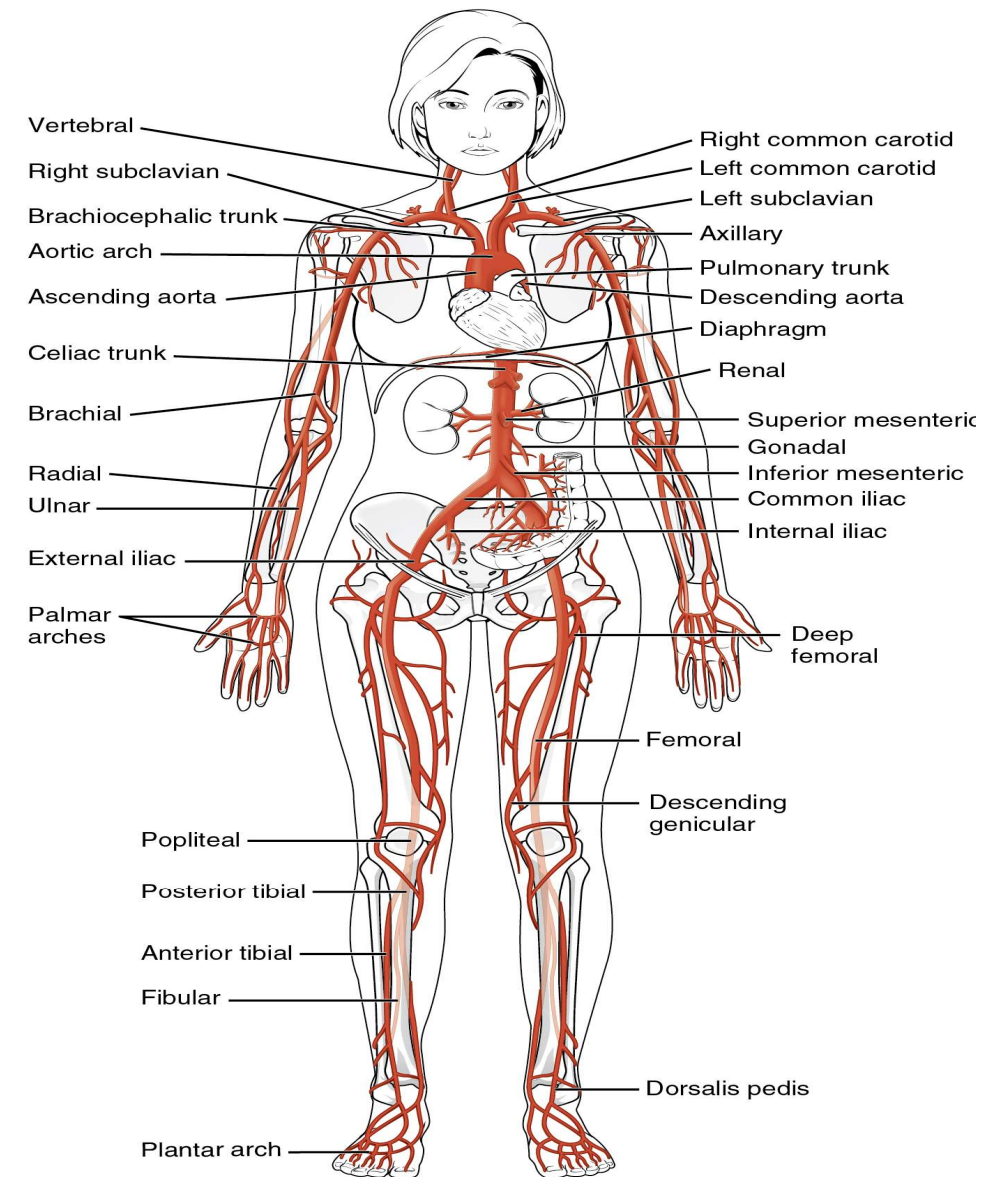
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(a)

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Figure 19.19



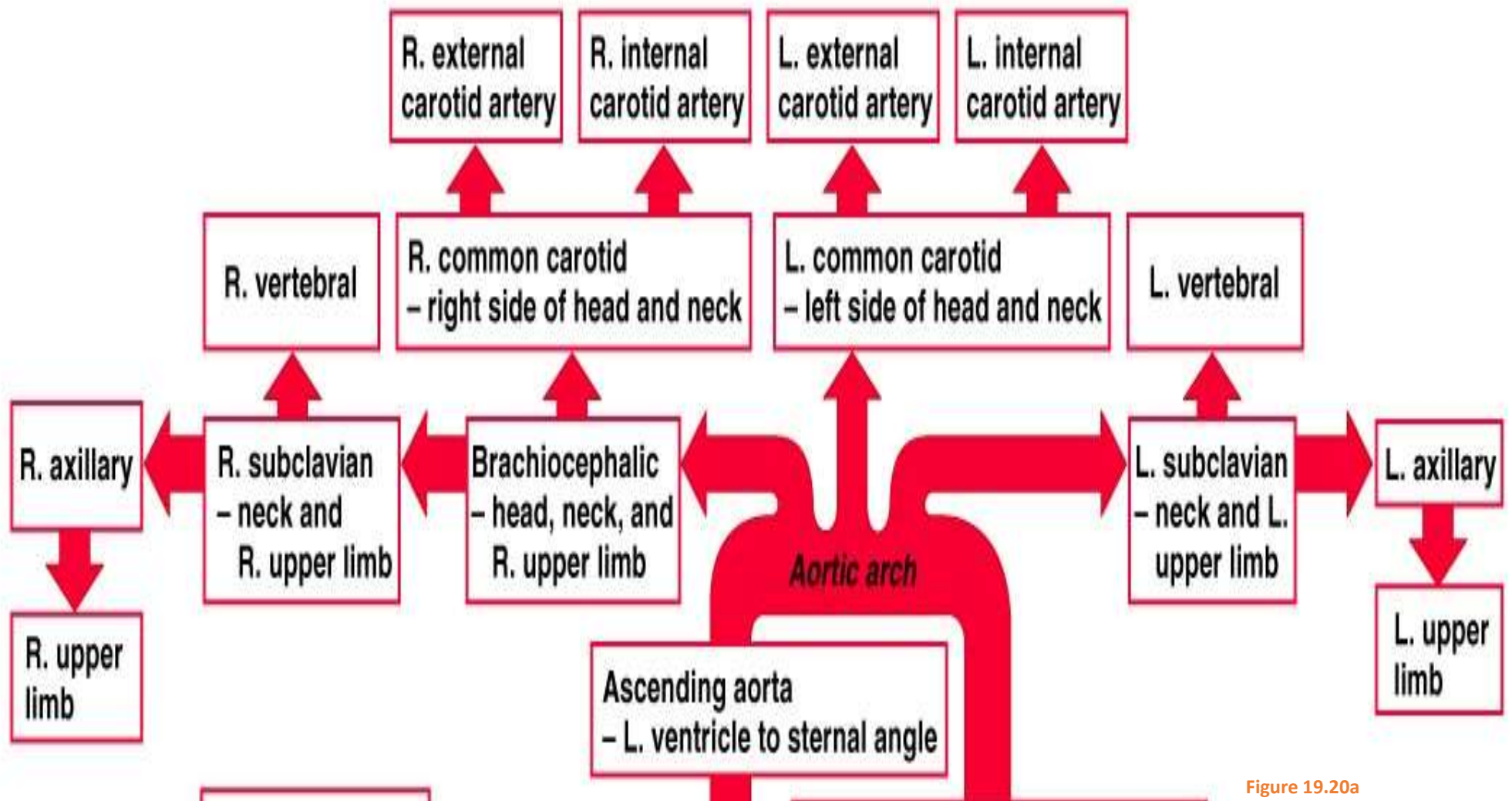
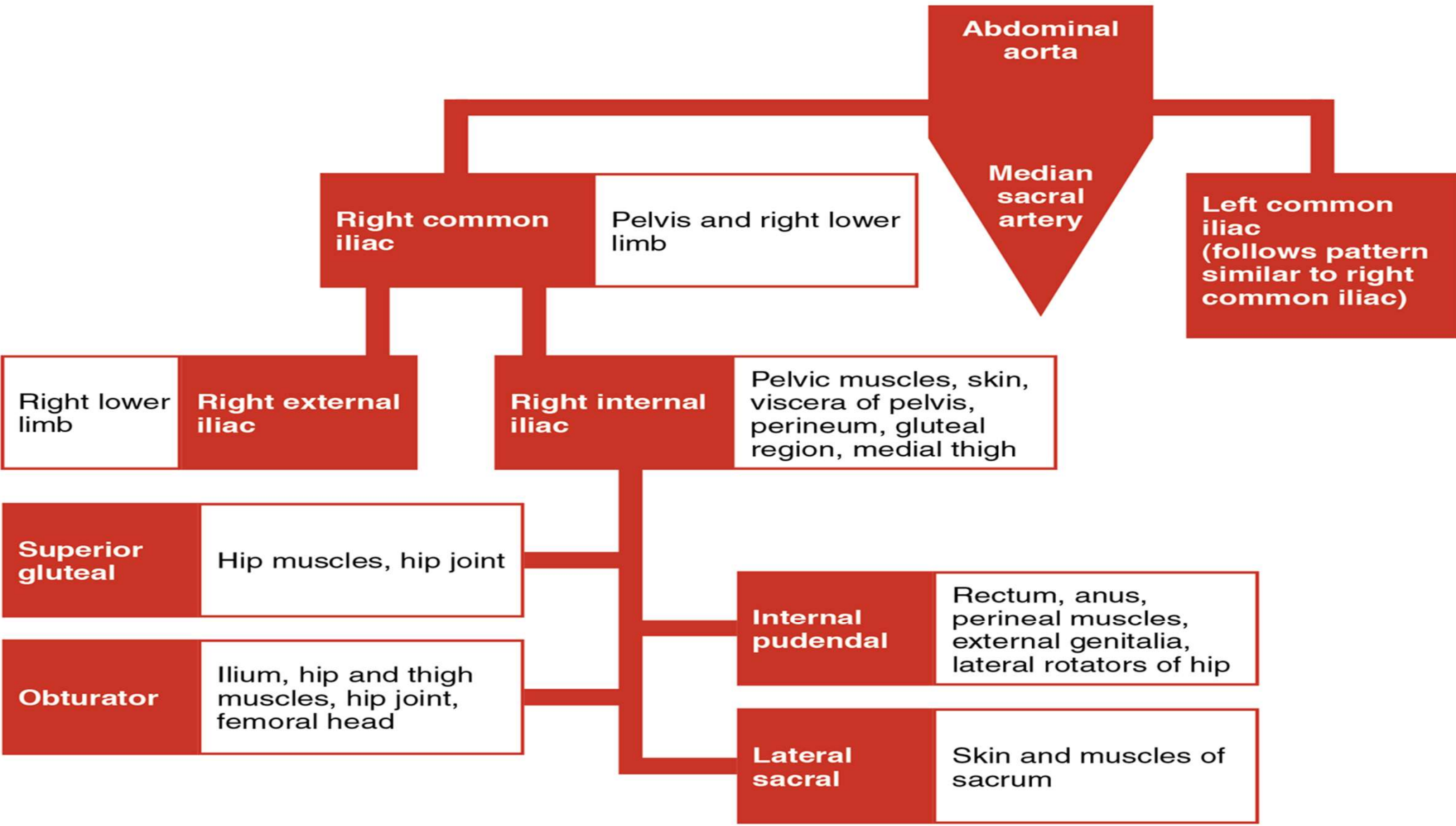
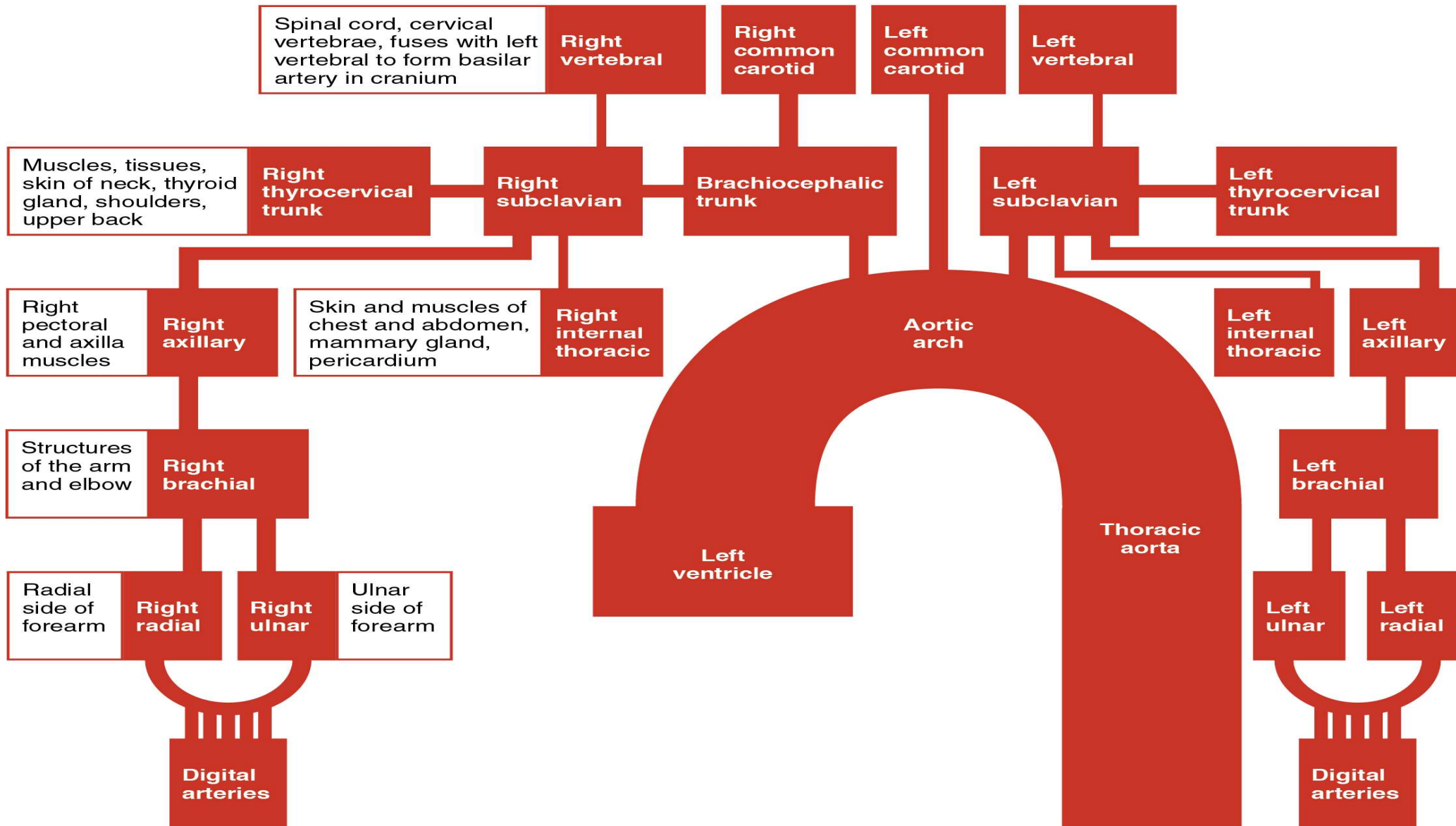
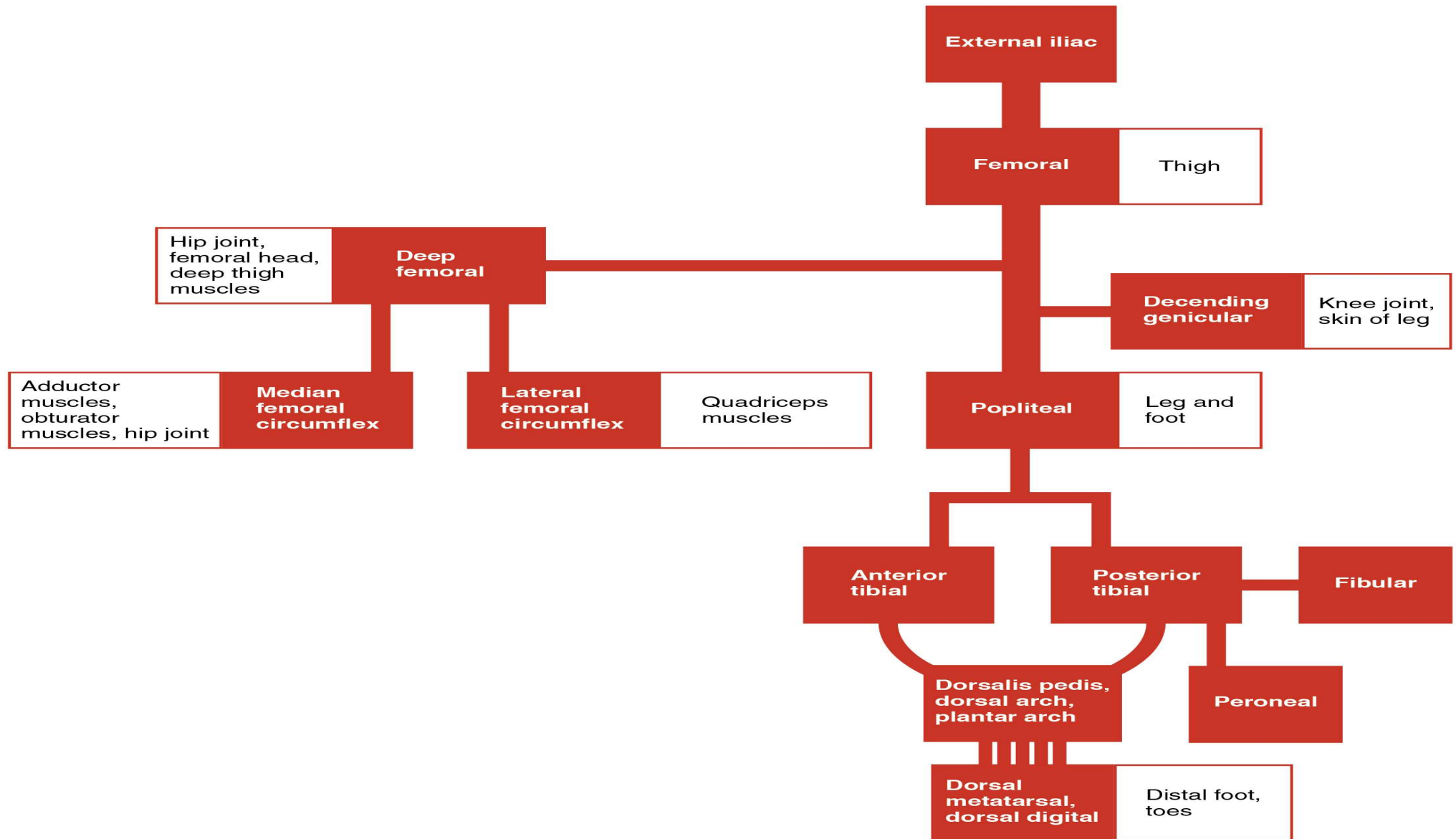
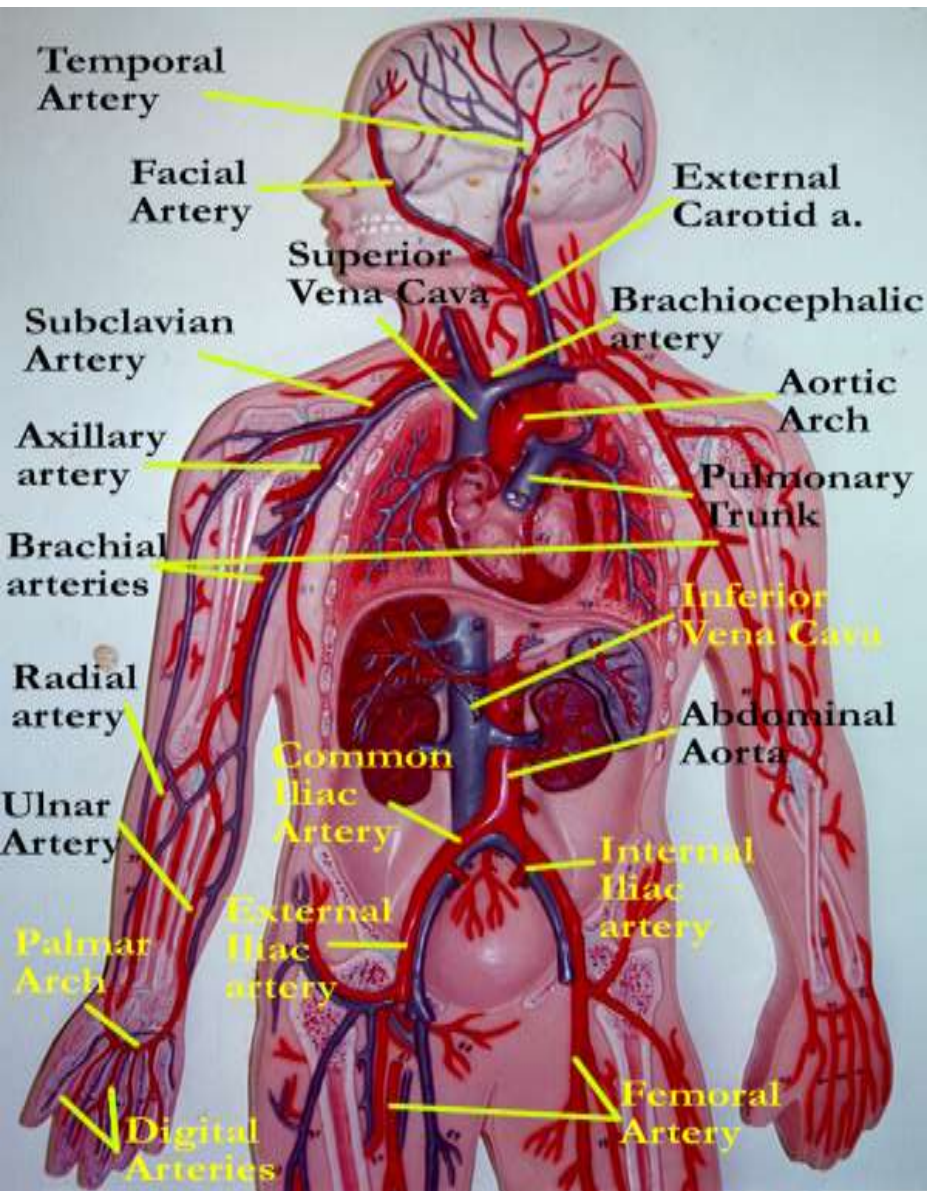


Figure 19.20a









https://www.youtube.com/watch?v=xuIFY3onWPQ&ab_channel=GeekyMedics

R. common carotid artery

R. subclavian artery

Brachiocephalic trunk

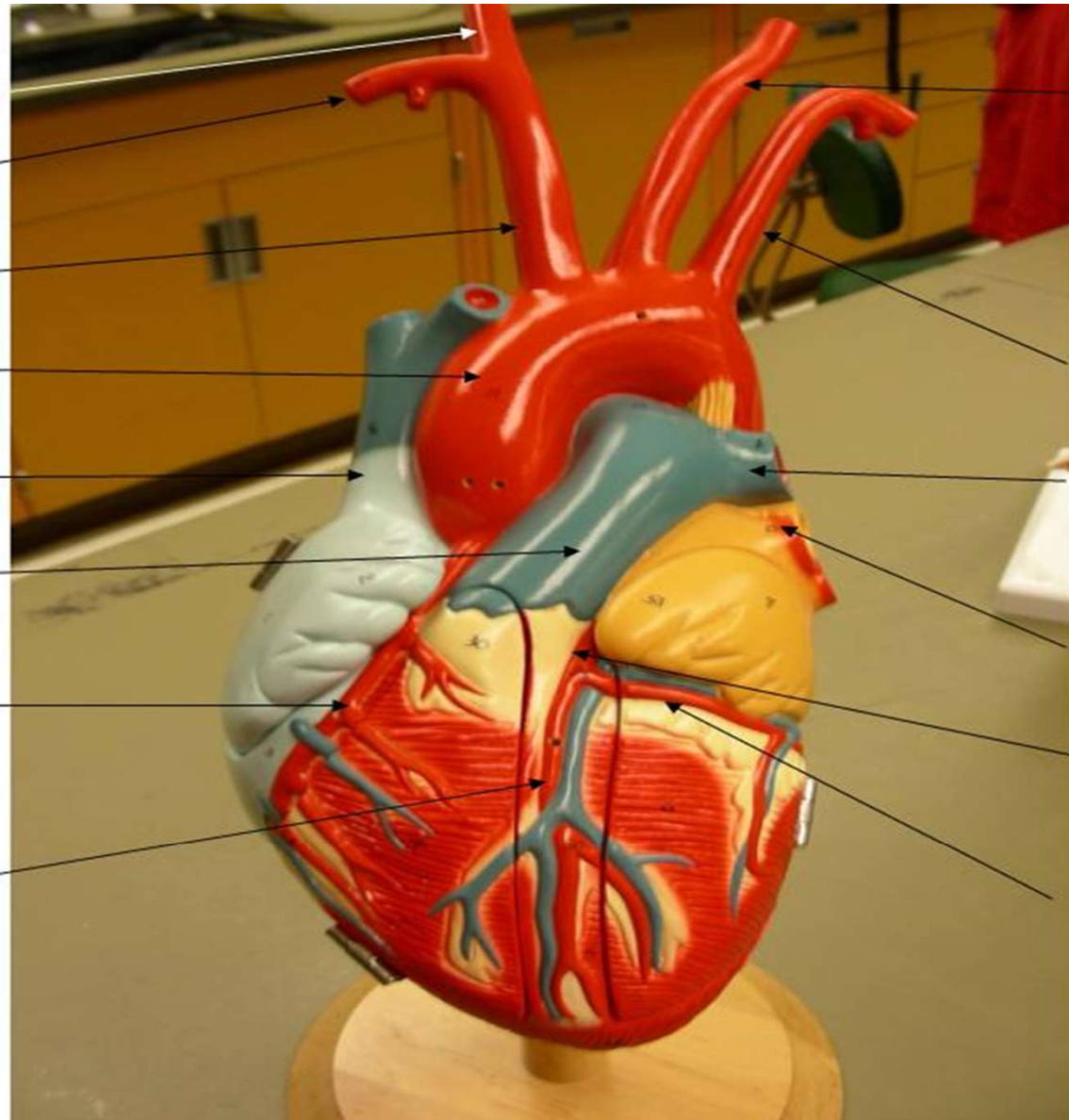
Aorta

Superior vena
cava

Pulmonary trunk

R. Coronary
artery

Anterior
interventricular
artery



Left
common
carotid
artery

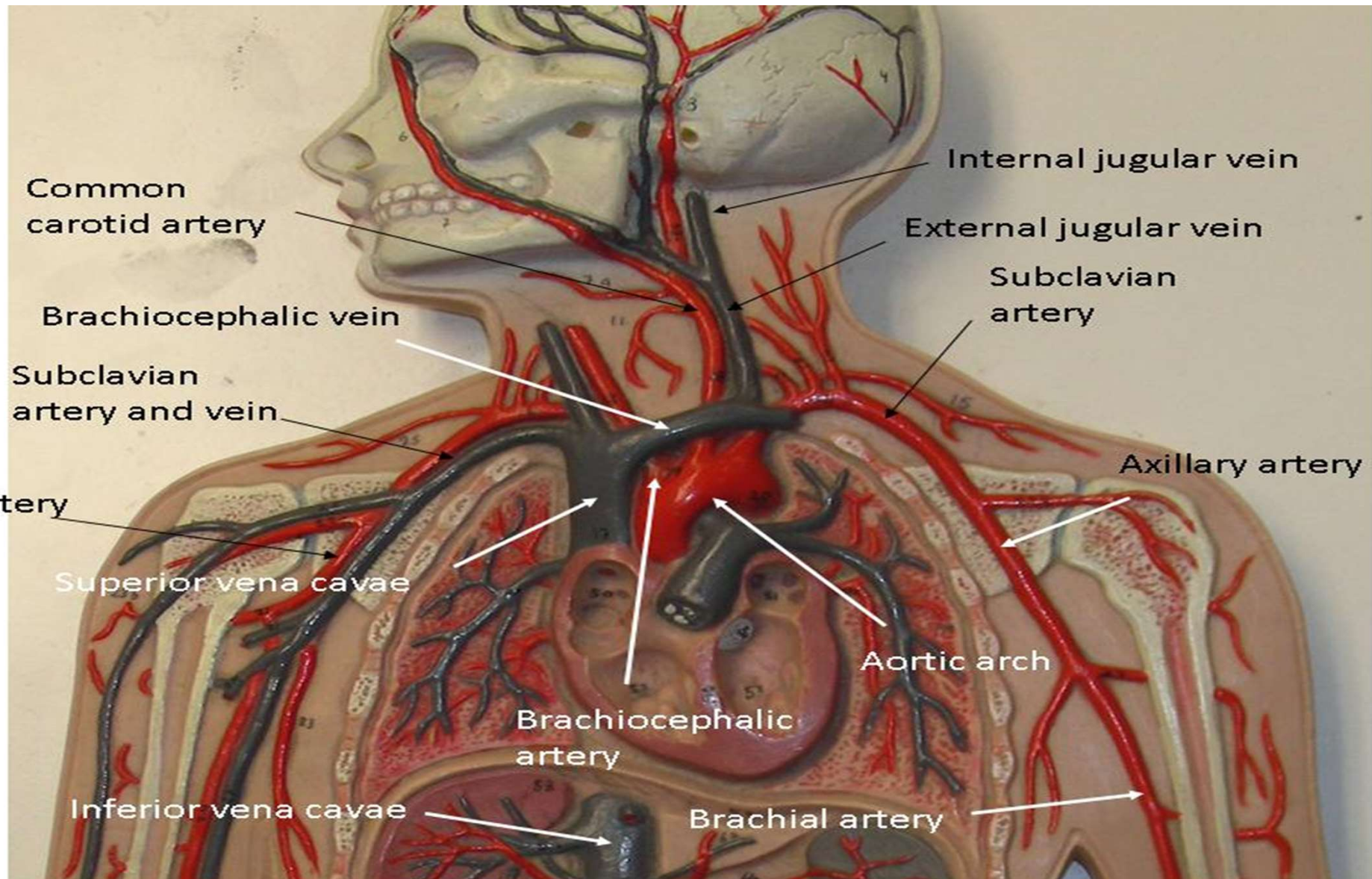
Left
subclavian
artery

L.
Pulmonary
artery

Pulmonary
veins

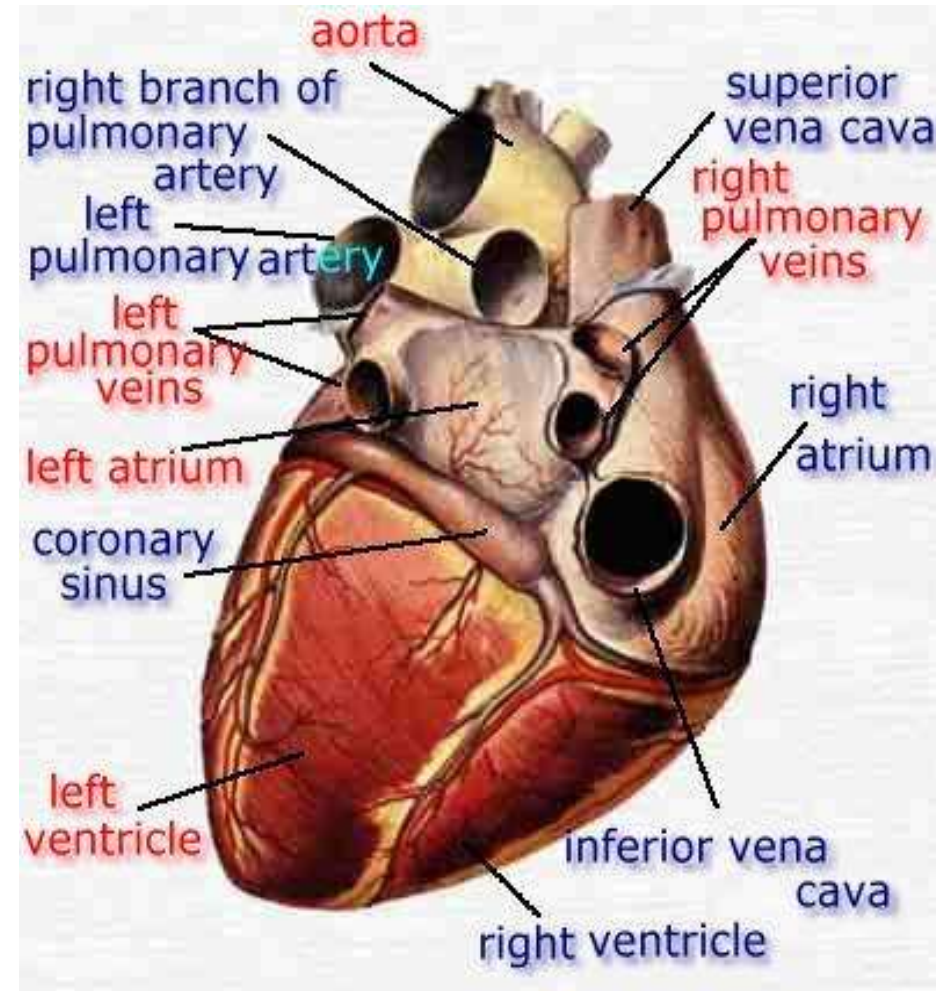
L. Coronary
artery

Circumflex
artery



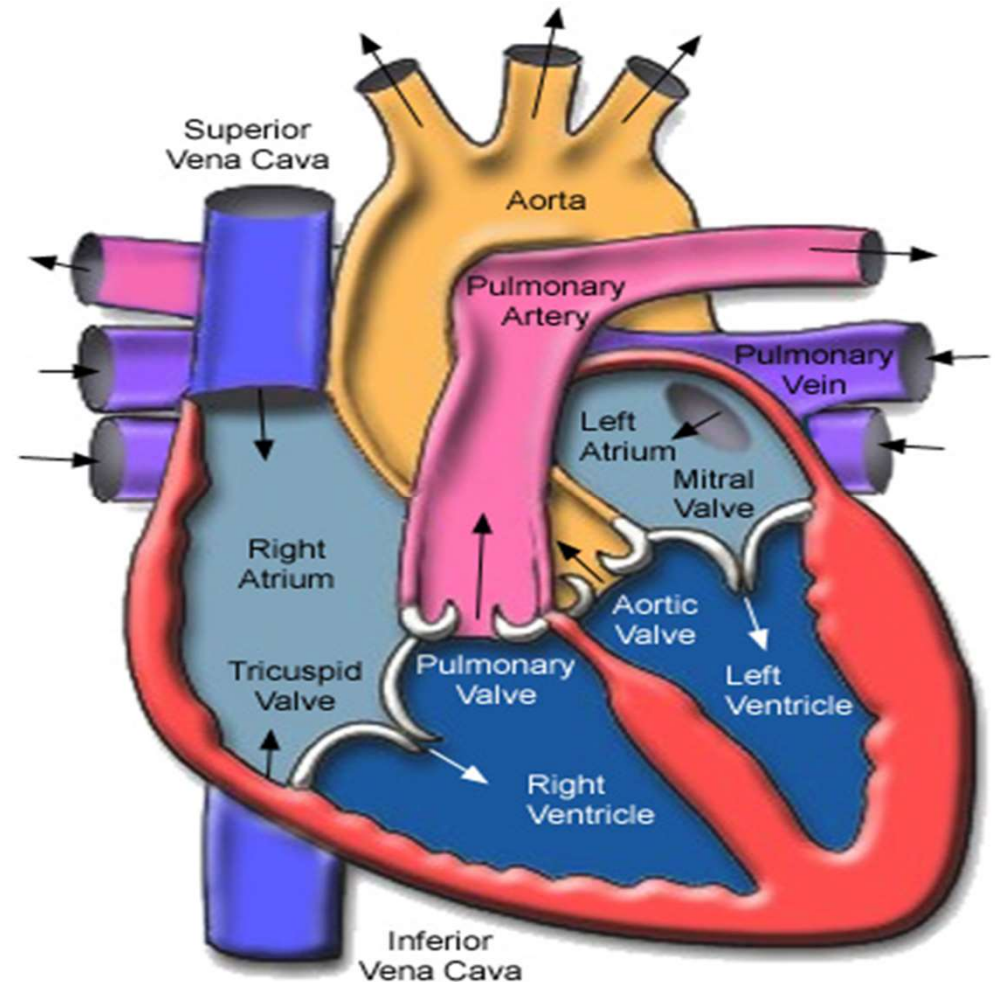
External Heart: Major Vessels of the Heart (Anterior View)

- Vessels returning blood to the heart include:
 - Superior and inferior venae cavae
 - Right and left pulmonary veins
- Vessels conveying blood away from the heart:
 - Pulmonary trunk, which splits into right and left pulmonary arteries
 - Ascending aorta (three branches) – brachiocephalic, left common carotid, and subclavian arteries



External Heart: Major Vessels of the Heart (Posterior View)

- **Vessels returning blood to the heart include:**
 - Right and left pulmonary veins
 - Superior and inferior venae cavae
- **Vessels conveying blood away from the heart include:**
 - Aorta
 - Right and left pulmonary arteries



External Heart: Vessels that Supply/Drain the Heart (Posterior View)

- **Arteries** –

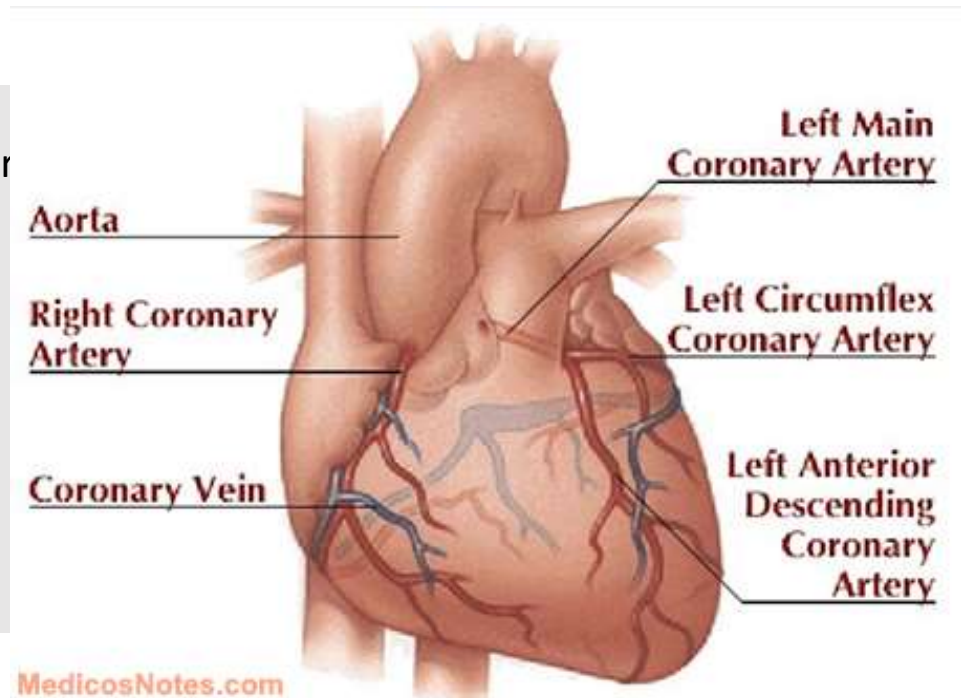
- right coronary artery (in atrioventricular groove)
- the posterior interventricular artery (in interventricular groove)

- **Veins** –

- great cardiac vein,
- posterior vein to left ventricle,
- coronary sinus,
- middle cardiac vein

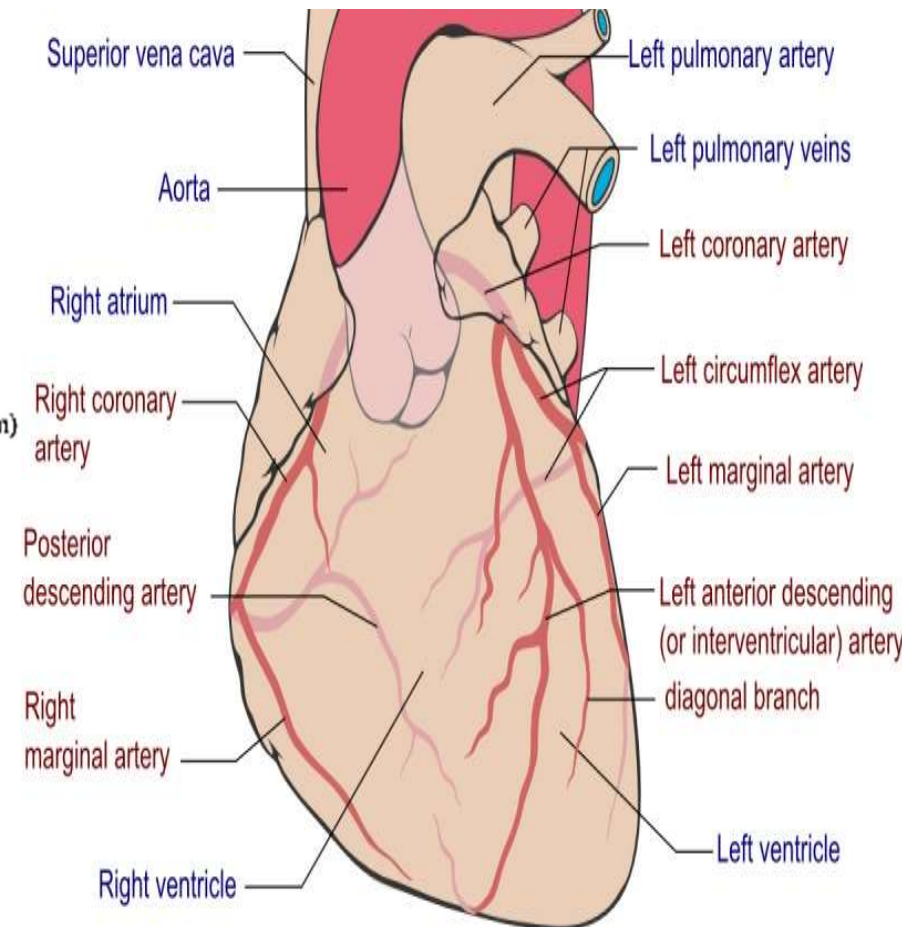
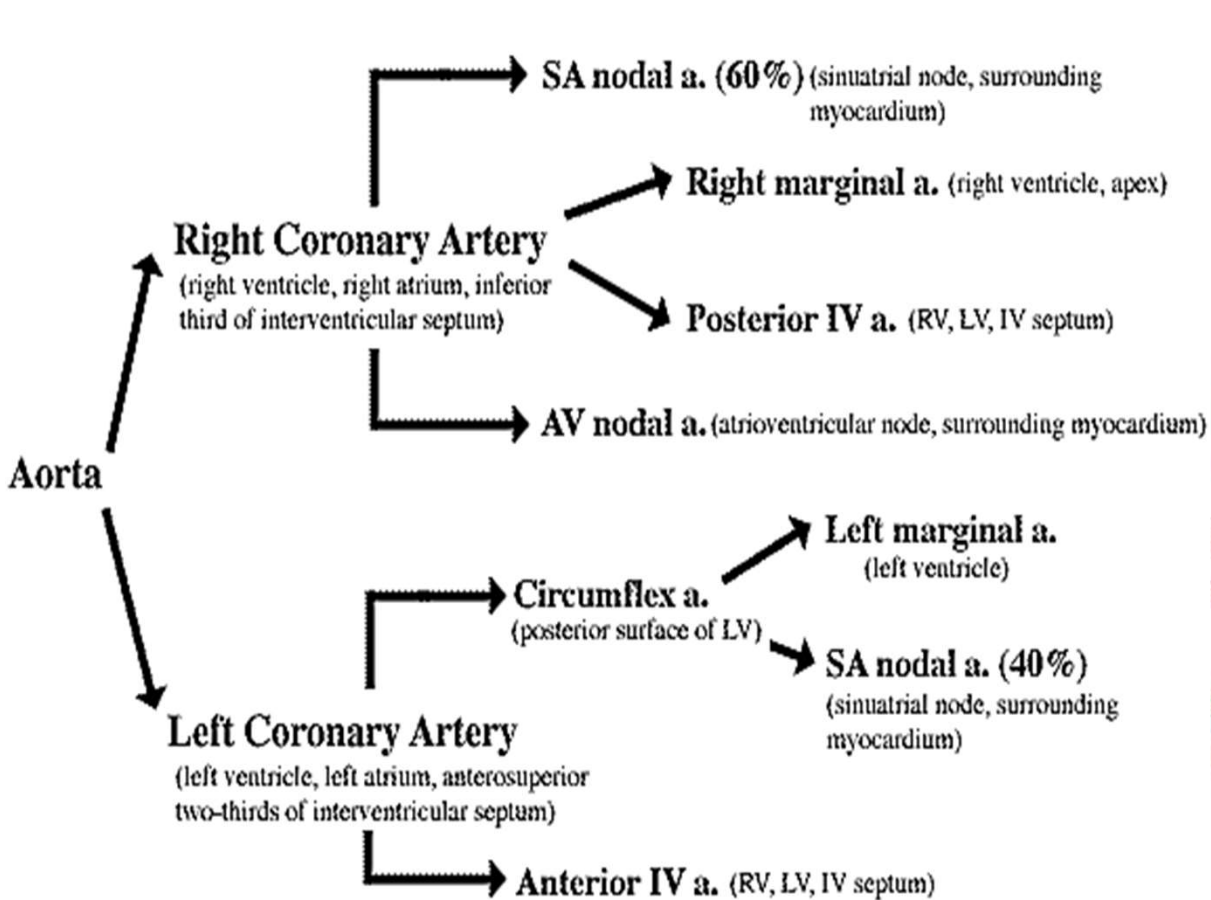
External Heart: Vessels that Supply/Drain the Heart (Anterior View)

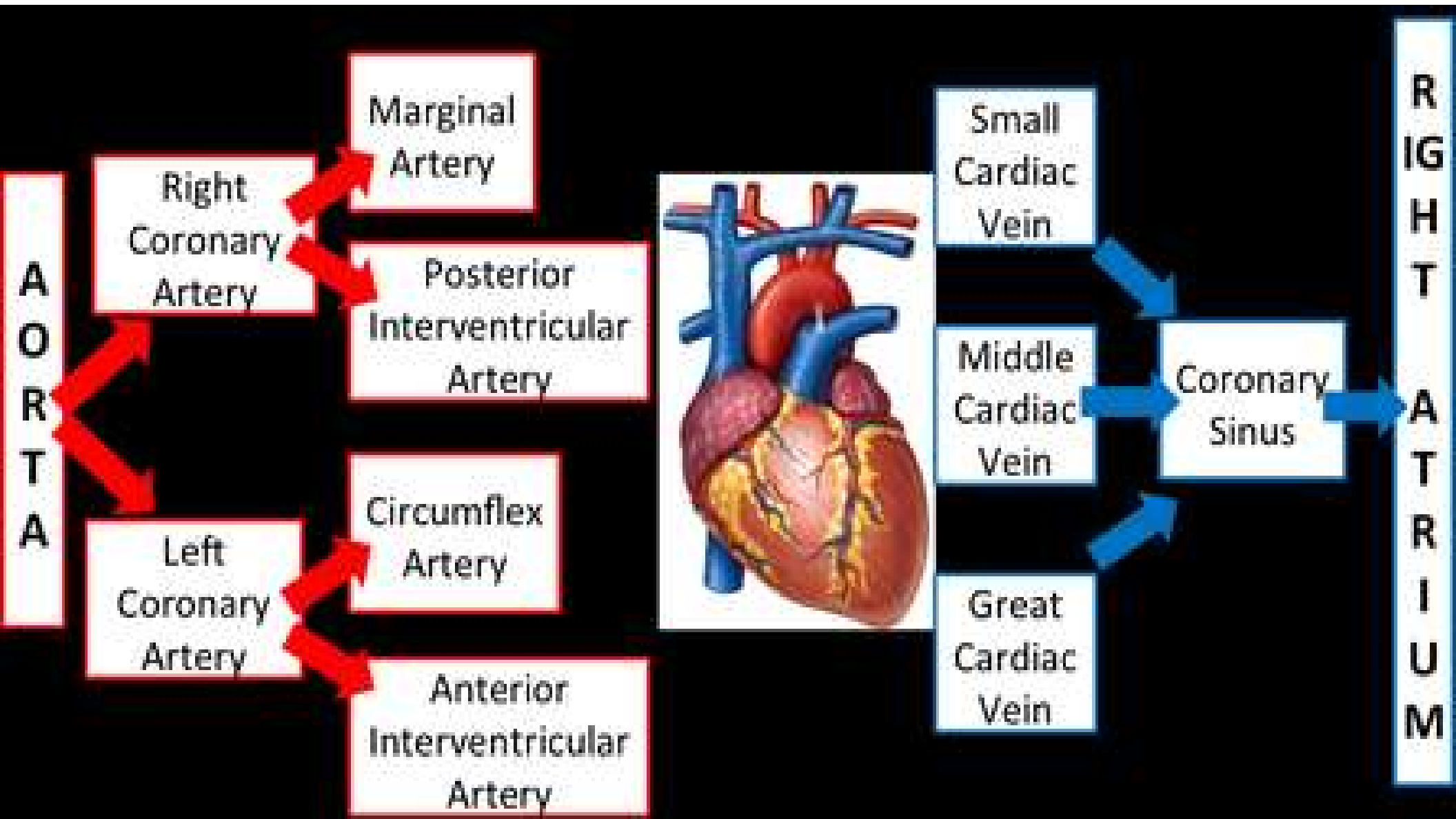
- **Arteries** –
 - right and left coronary (in atrioventricular groove),
 - marginal,
 - circumflex,
 - anterior interventricular arteries
- **Veins** –
 - small cardiac,
 - anterior cardiac
 - great cardiac veins

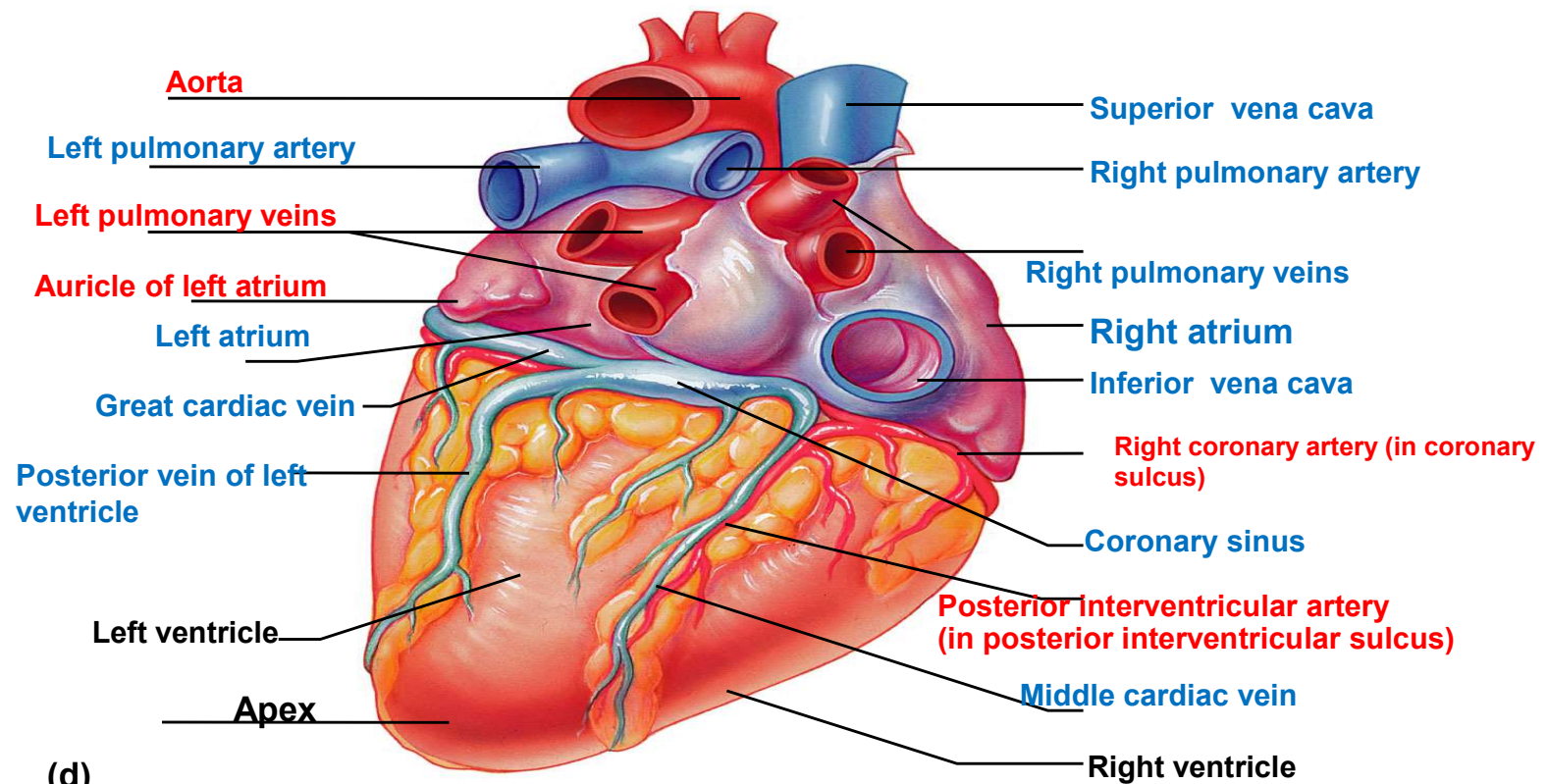


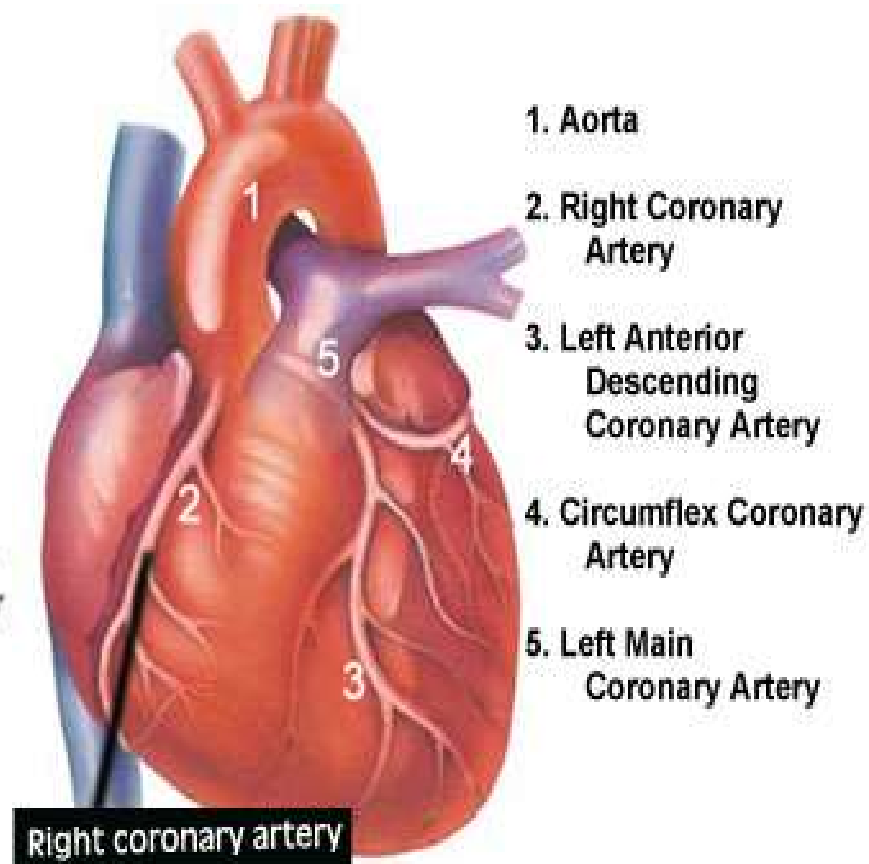
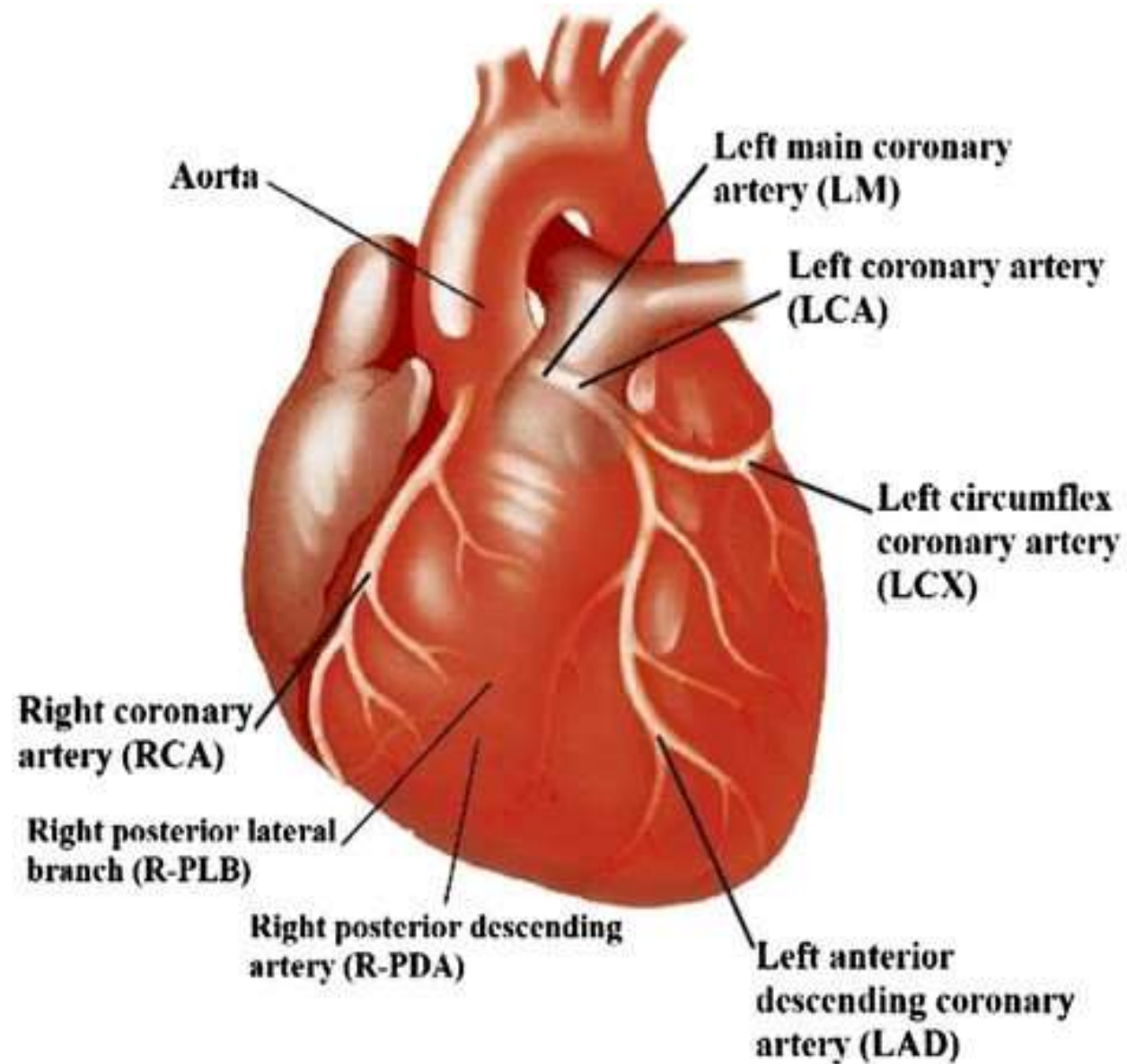
Coronary Circulation

- Coronary circulation is **the functional blood supply to the heart muscle itself**
- Collateral routes **ensure blood delivery to heart** even if major vessels are occluded

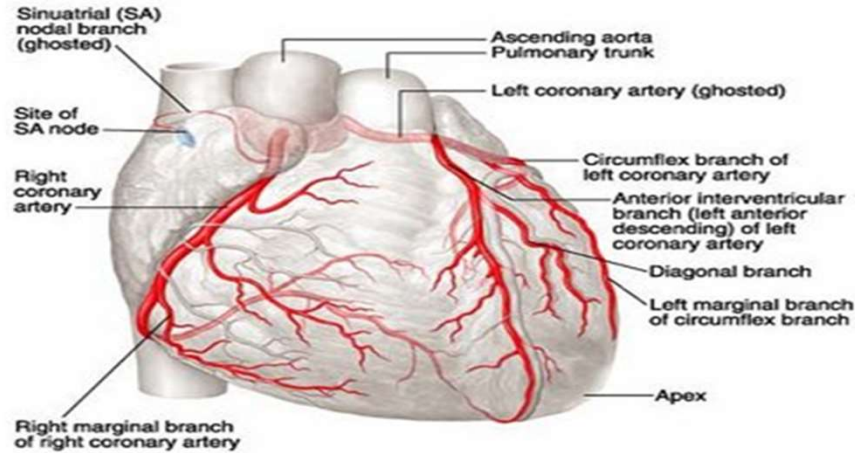




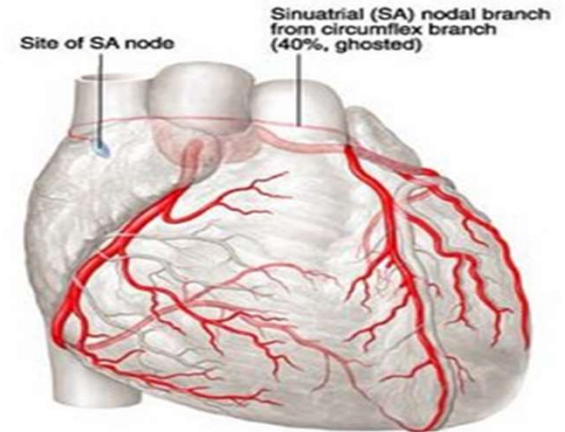




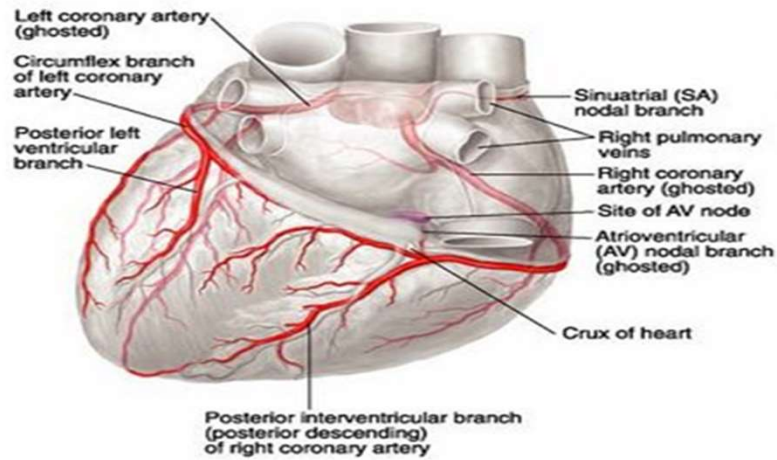
A. Normal arterial pattern, anterior view



B. Variation, anterior view



C. Normal arterial pattern, posteroinferior view



D. Variation, posteroinferior view

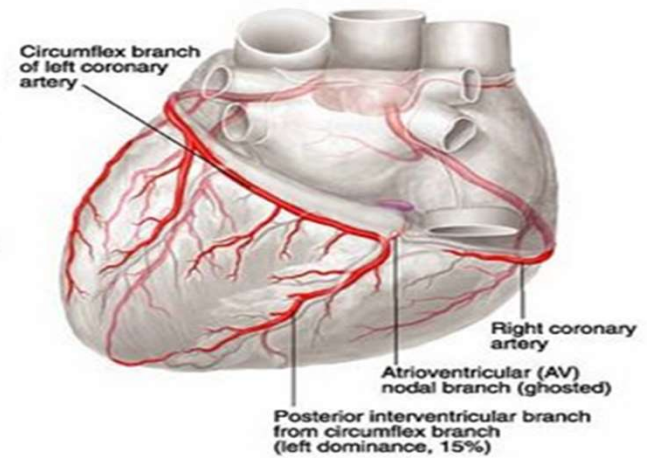
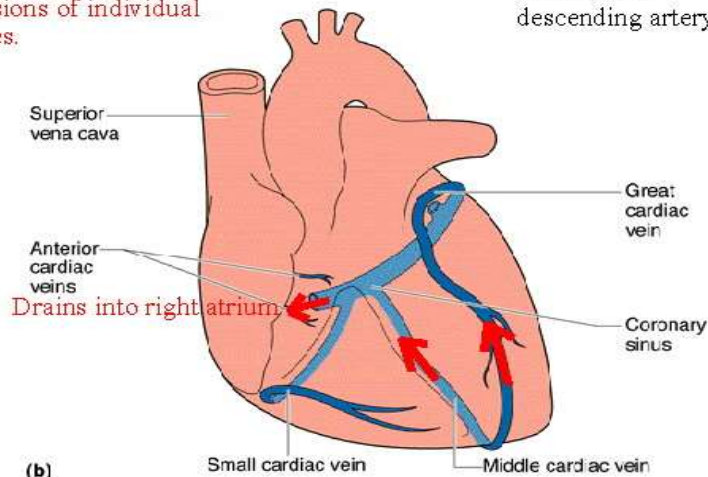
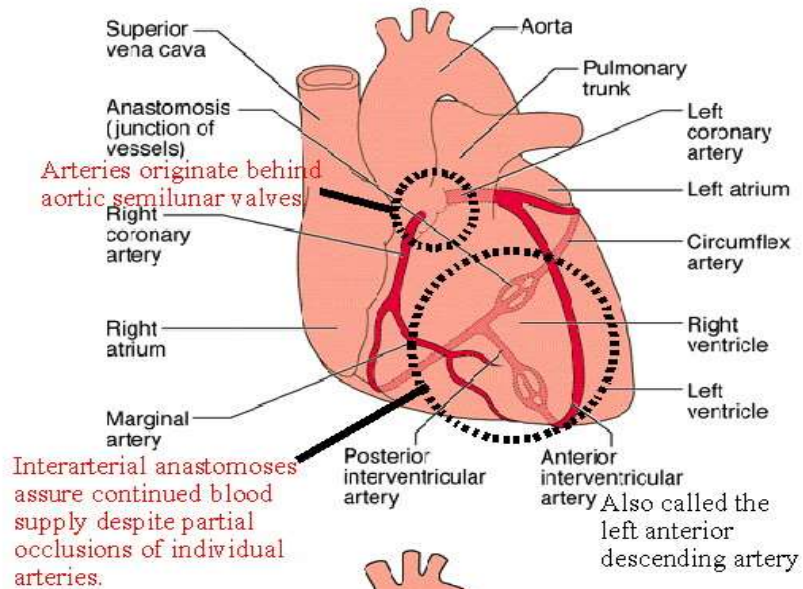


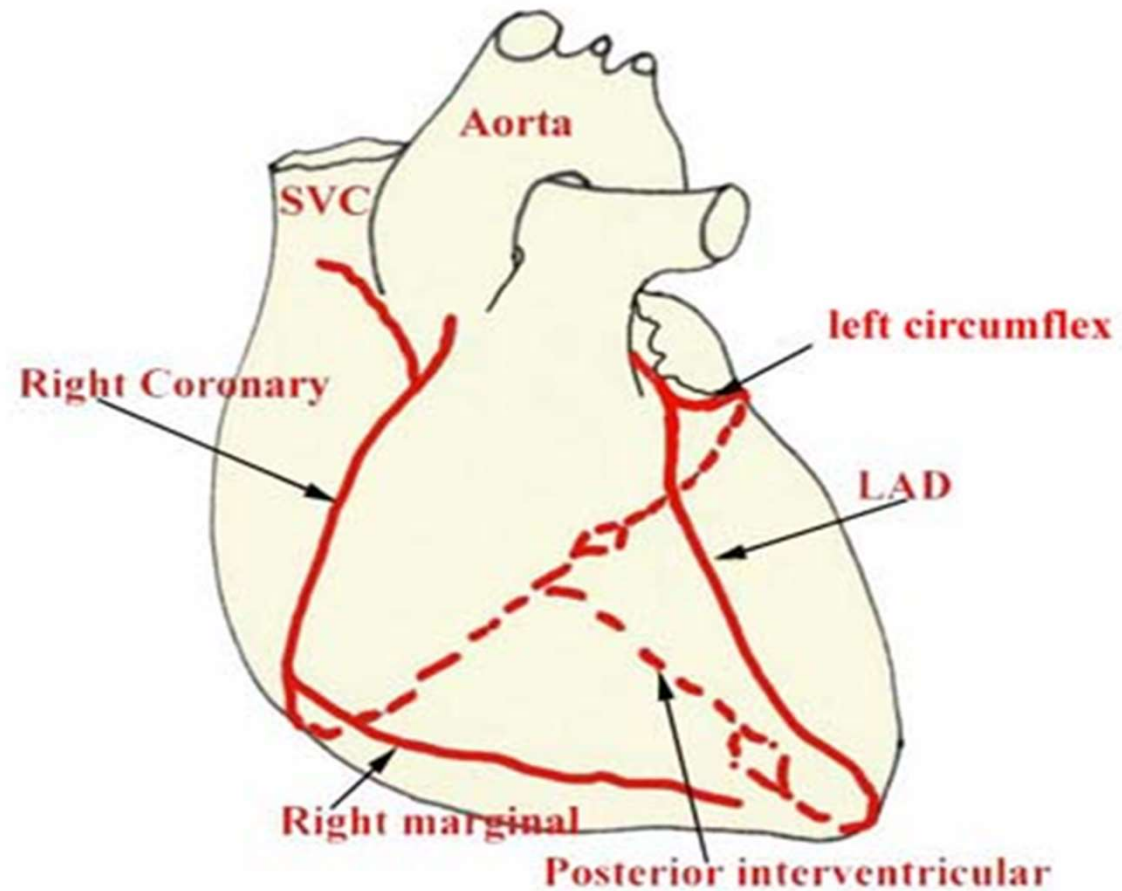
Plate 4-23 Coronary Arteries, Normal Patterns and Variations

The Coronary Circulation

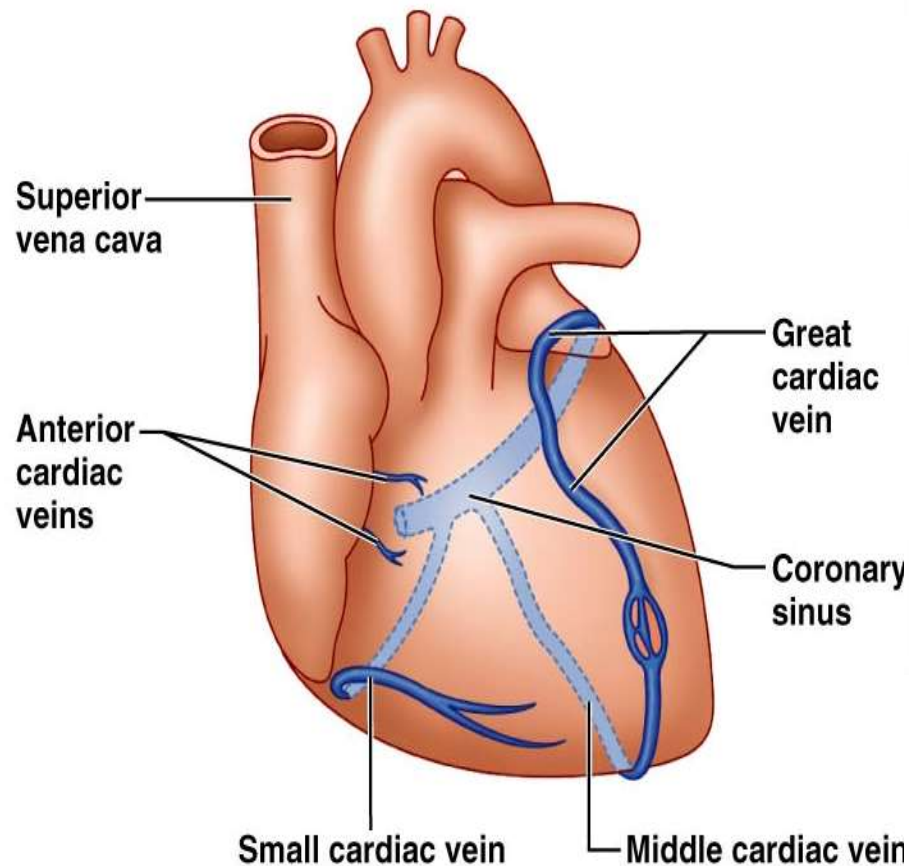


(b)

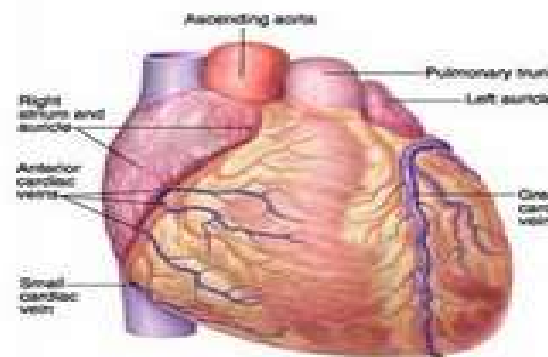
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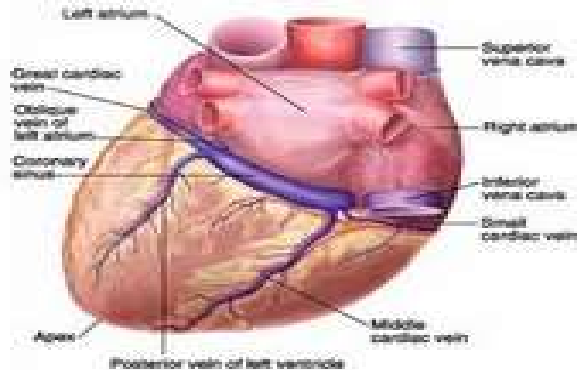
Coronary Circulation: Venous Supply



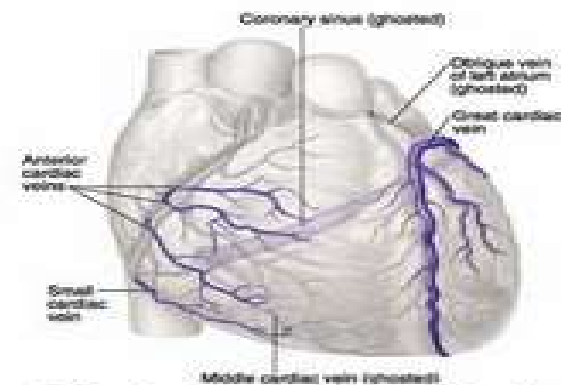
A. Anterior view



C. Posteroinferior view



B. Normal venous pattern, anterior view



D. Normal venous pattern, posteroinferior view

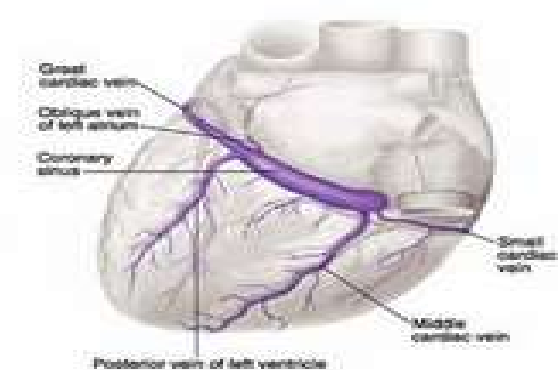
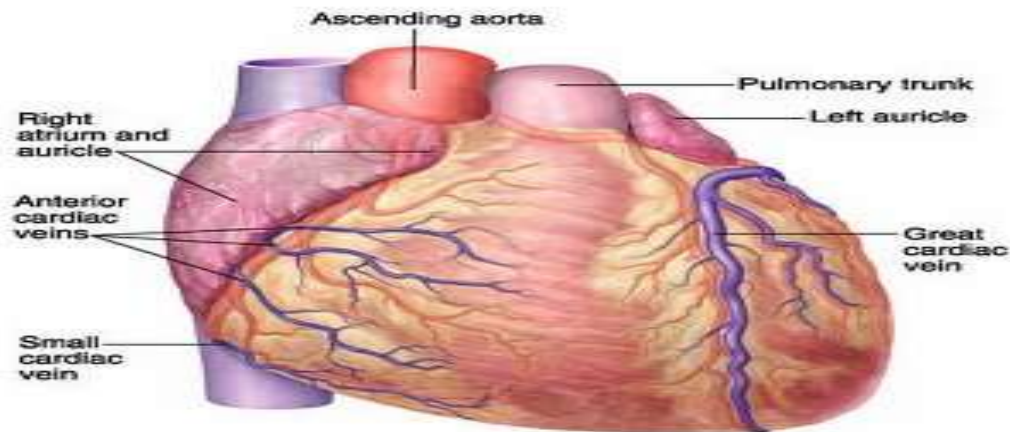


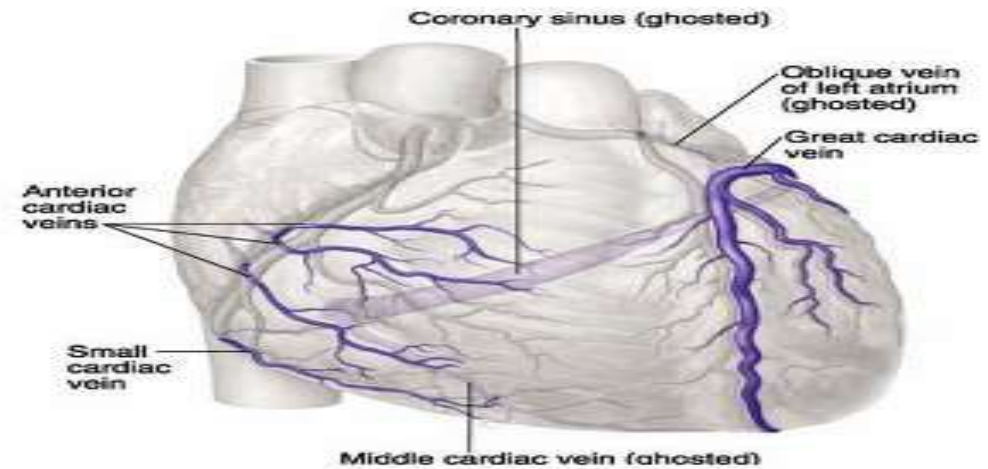
Plate 4-24 Cardiac Veins

(b)

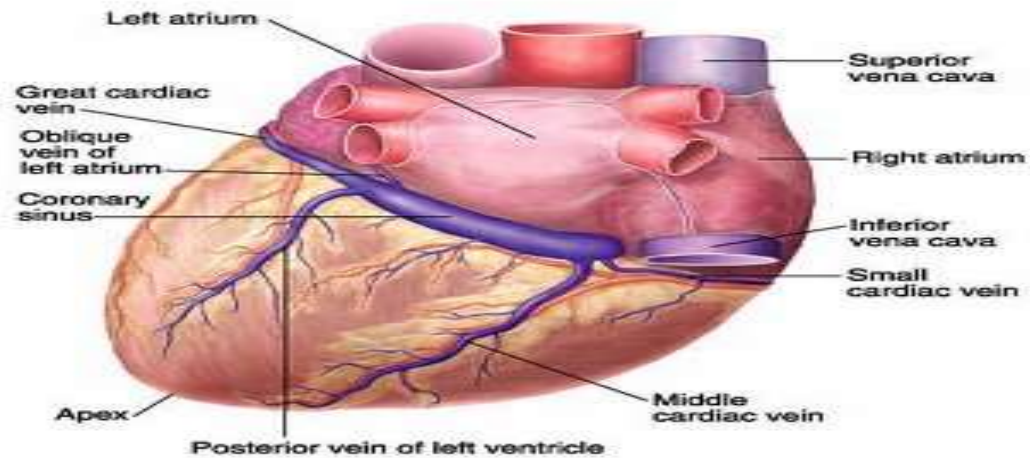
A. Anterior view



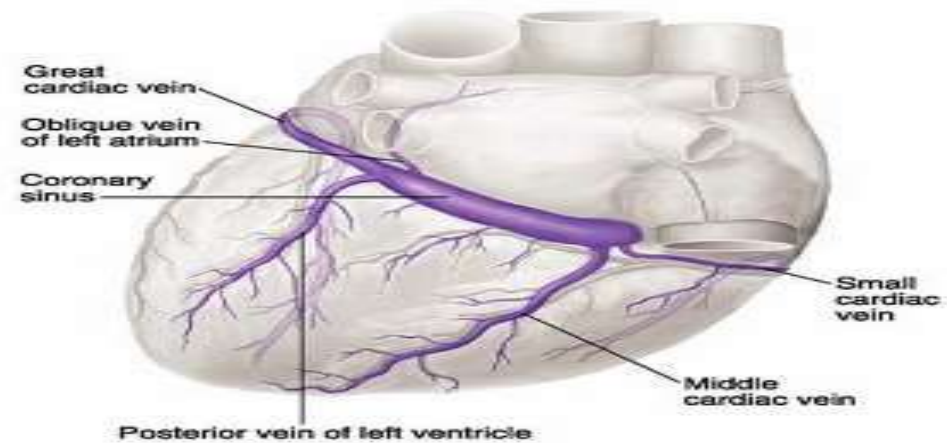
B. Normal venous pattern, anterior view



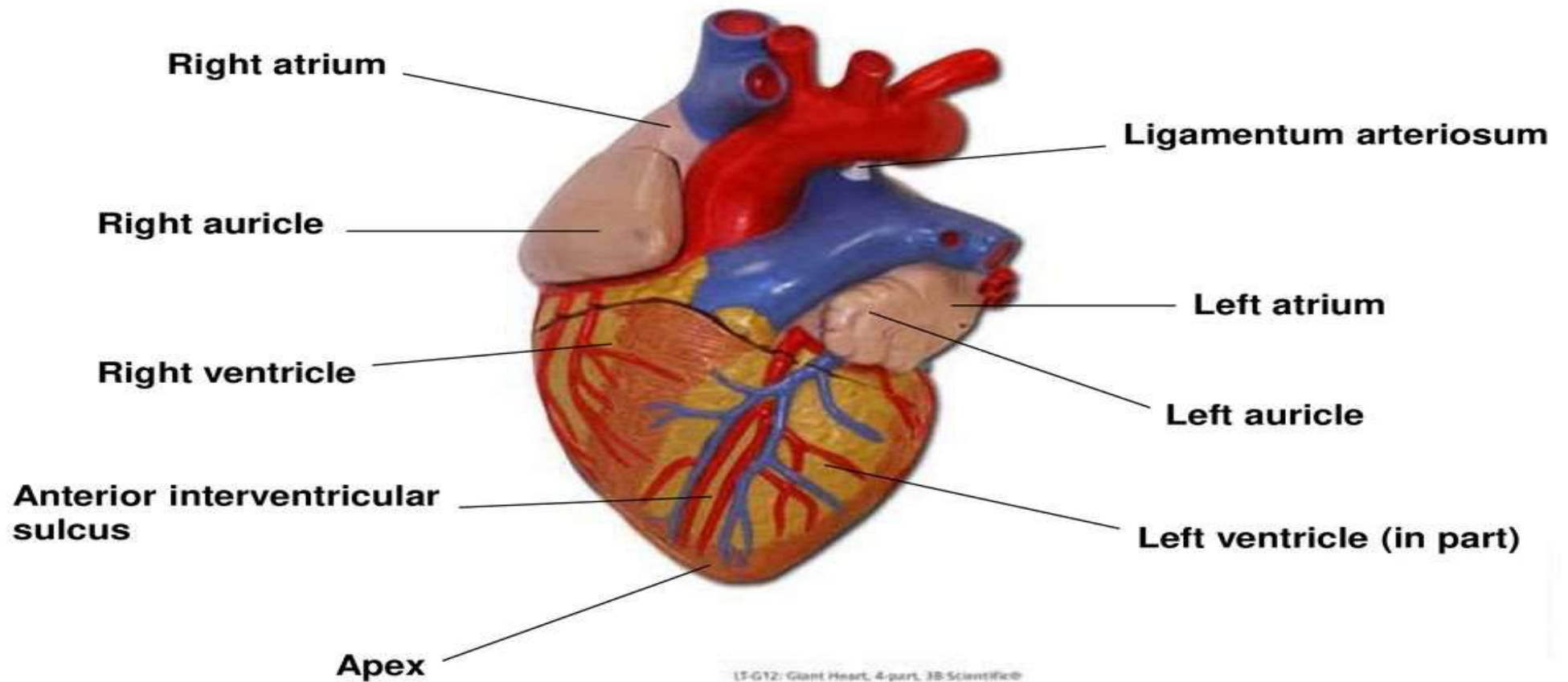
C. Posteroinferior view

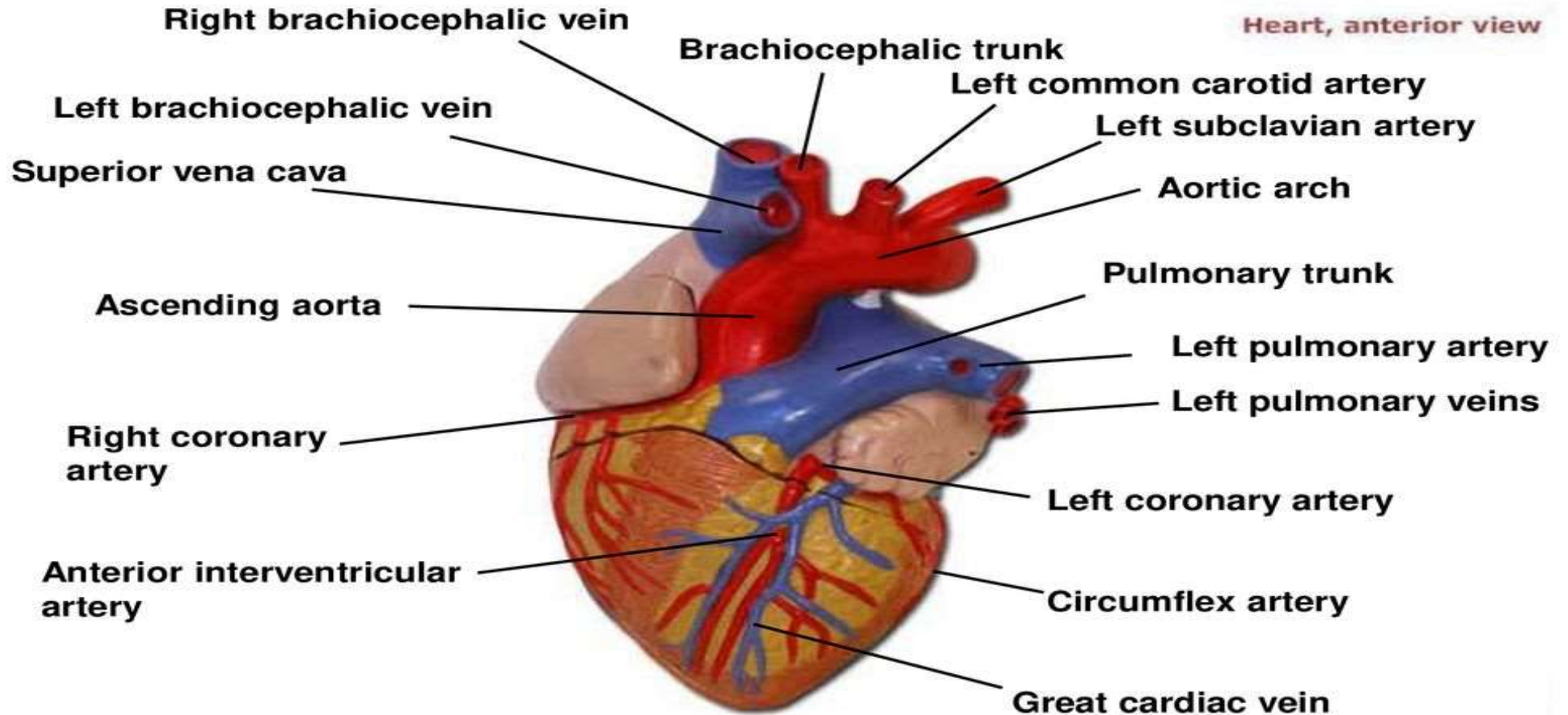


D. Normal venous pattern, posteroinferior view

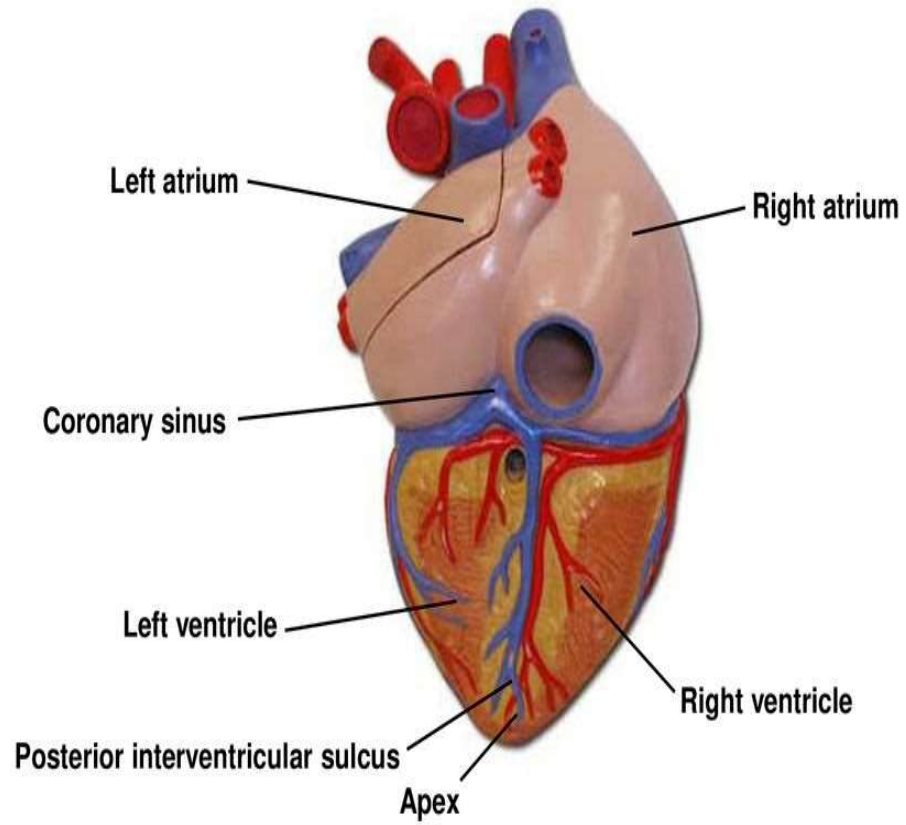


Heart, anterior view

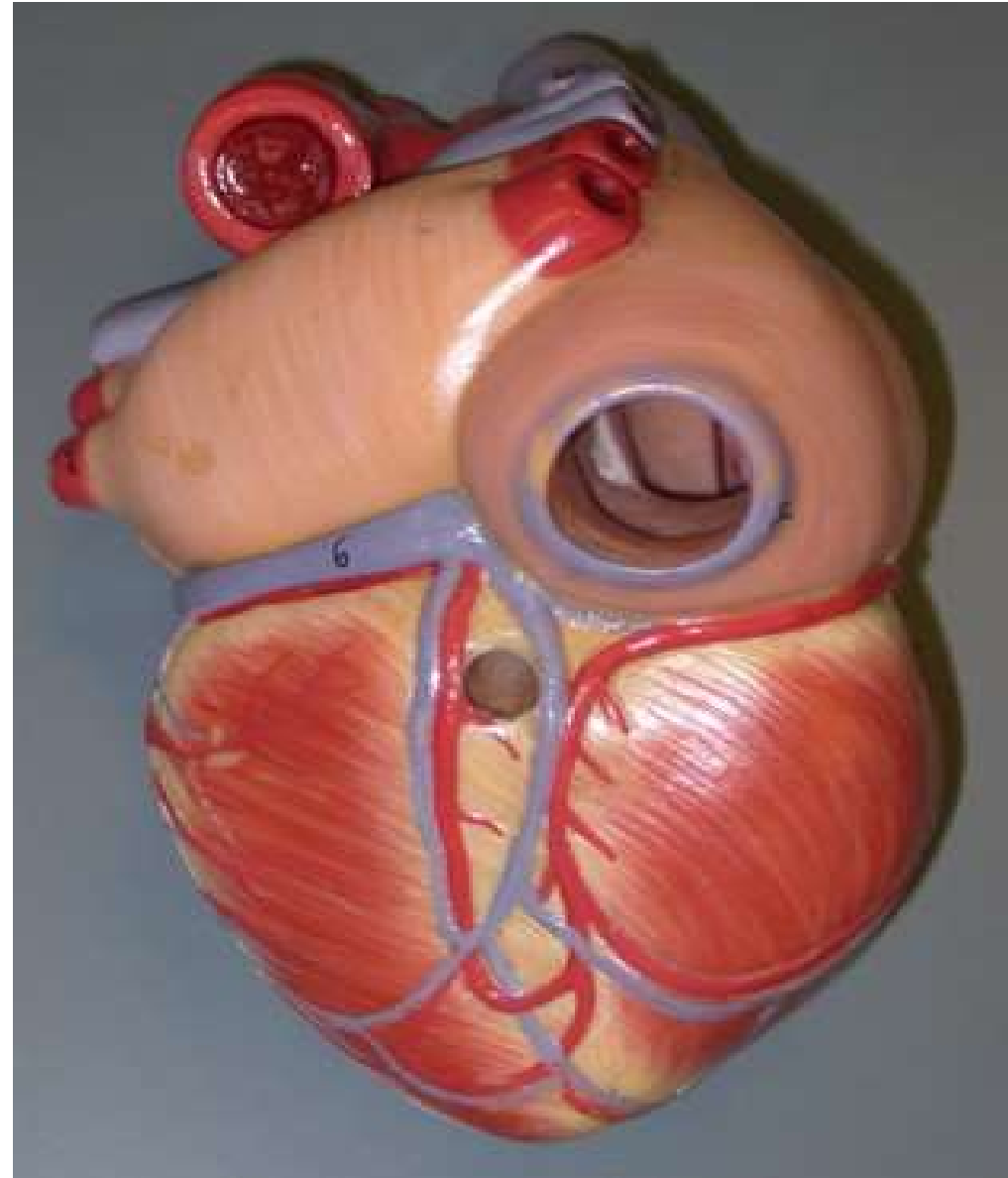




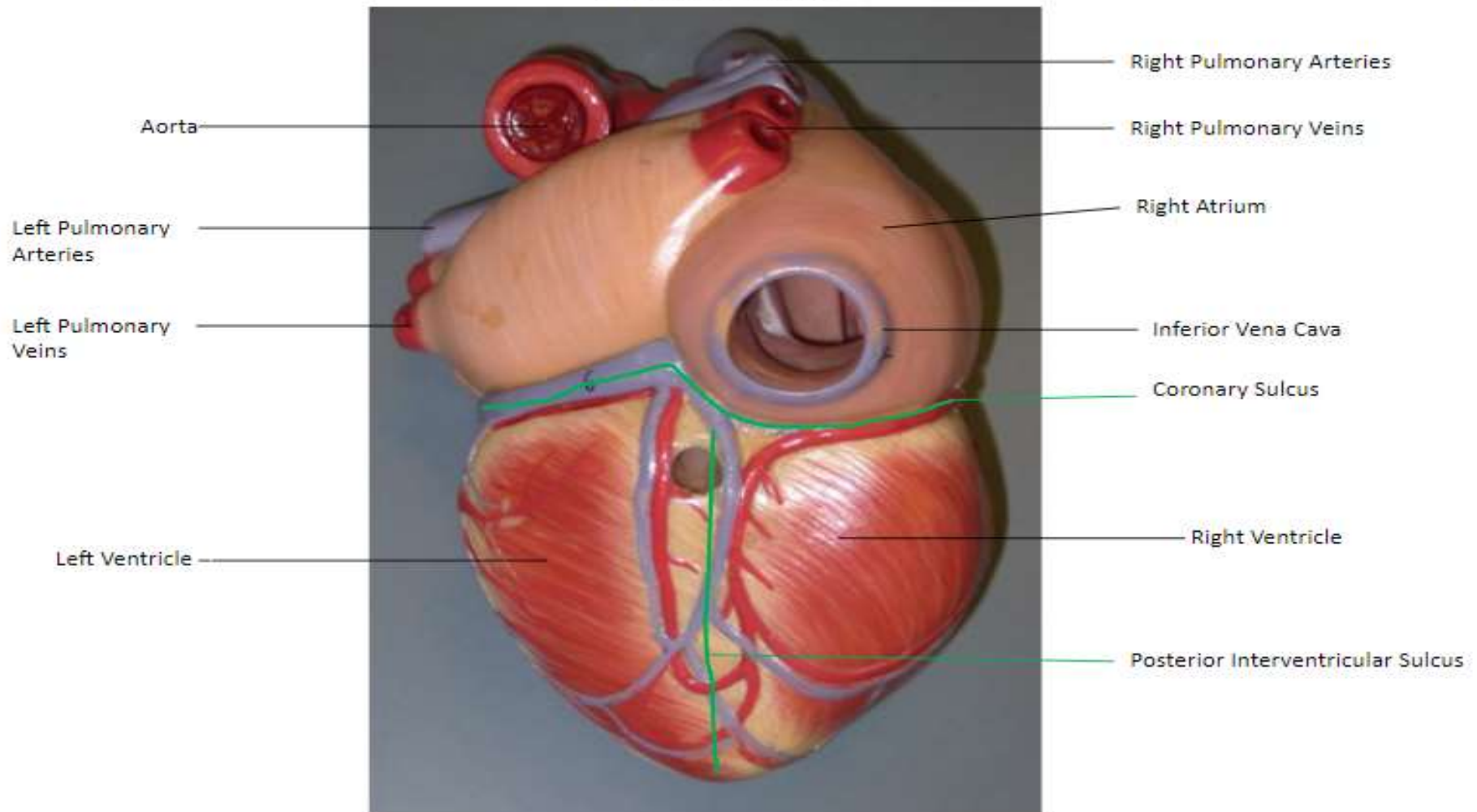
Heart, posterior view

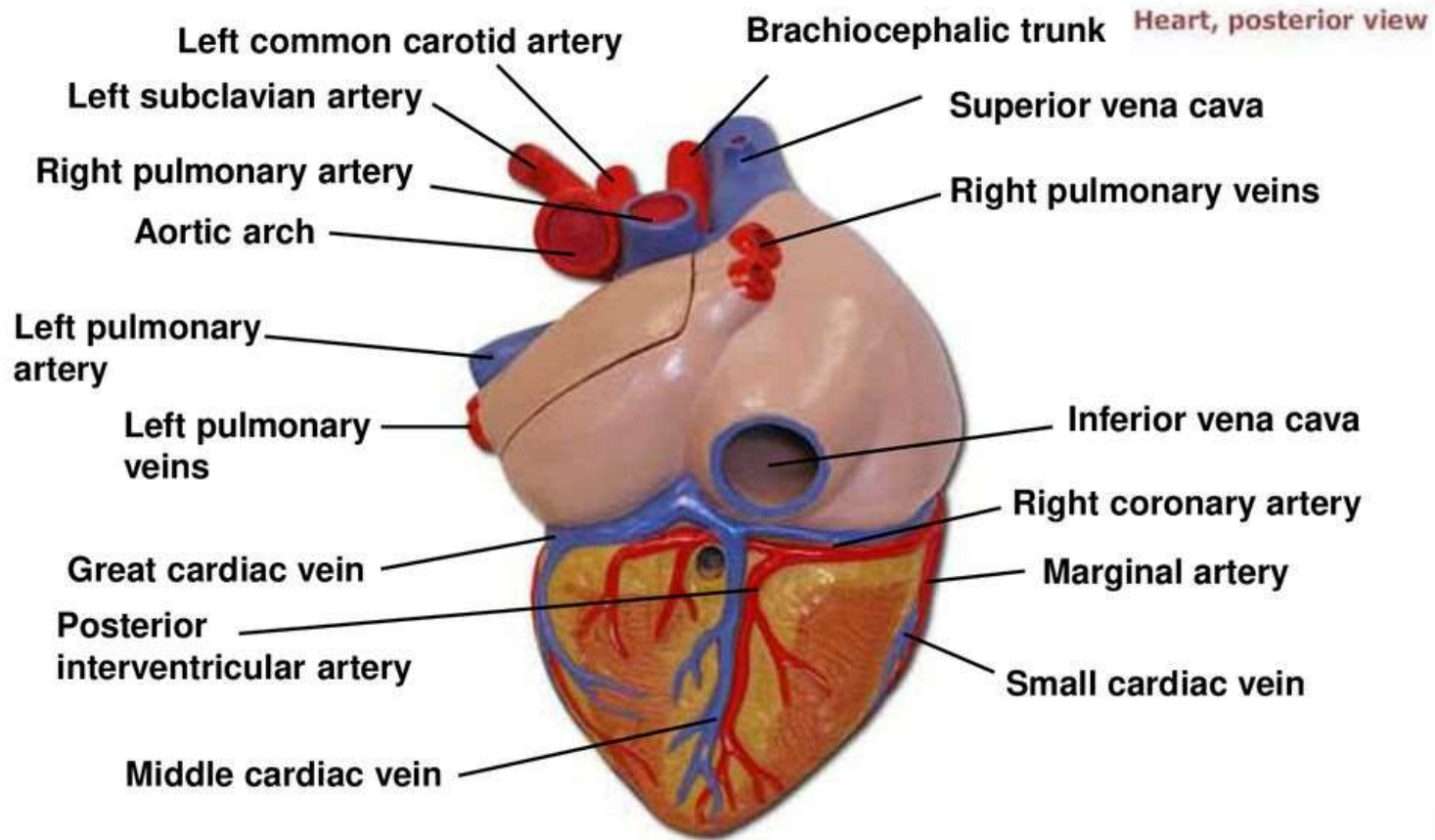


13-G12: Giant Heart, 4-part, 3D Scientific®

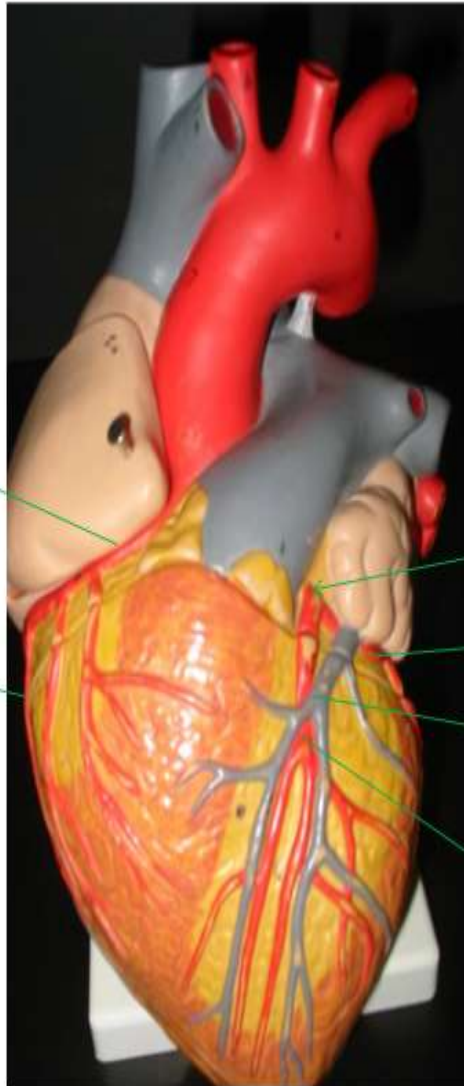


Posterior Heart





Right



Right Coronary Artery

Right Marginal Artery

Left

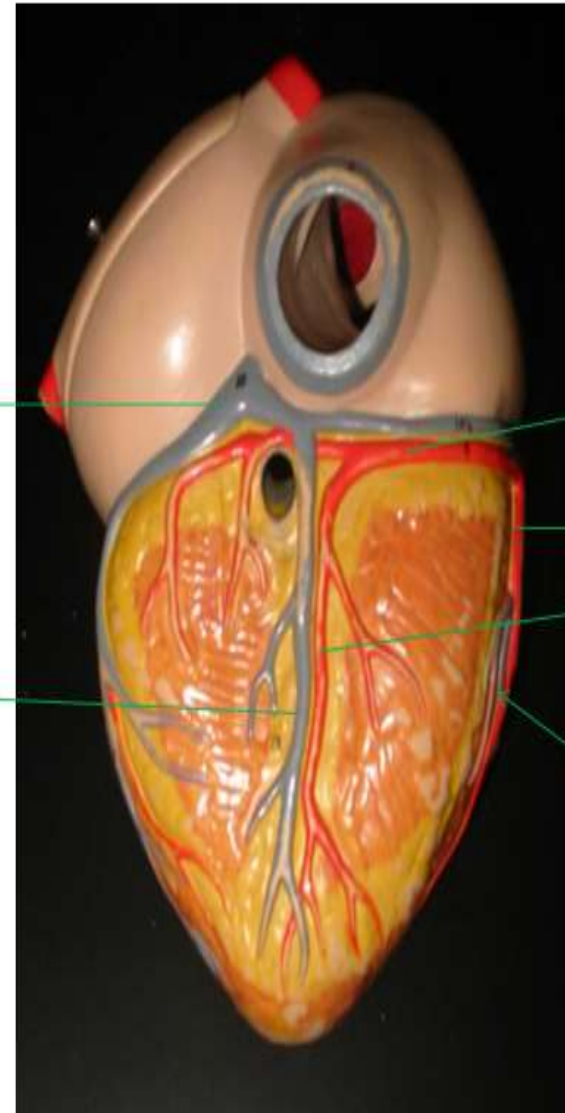
Left Coronary Artery
(Under the Pulmonary
Trunk)

Circumflex Artery

Great Cardiac Vein

Anterior Interventricular Artery

Left



Coronary Sinus

Middle Cardiac Vein

Right

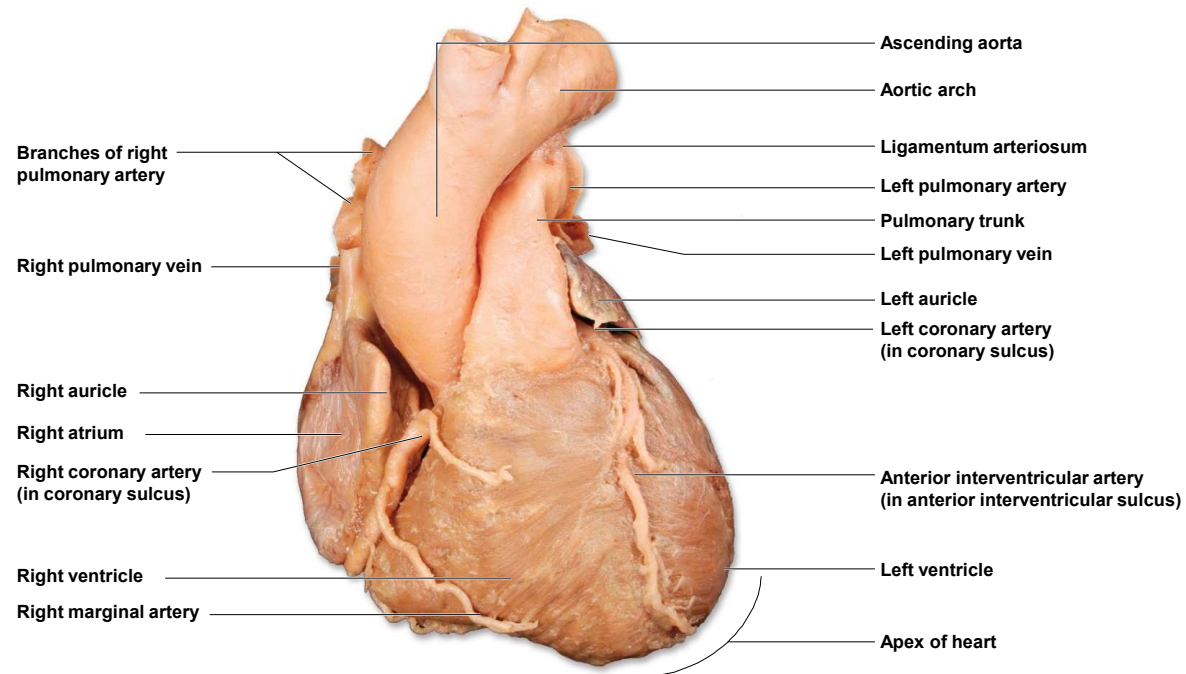
Right Coronary Artery

Right Marginal Artery

Posterior Interventricular
Artery

Small Cardiac Vein (beside
the Right Marginal Artery)

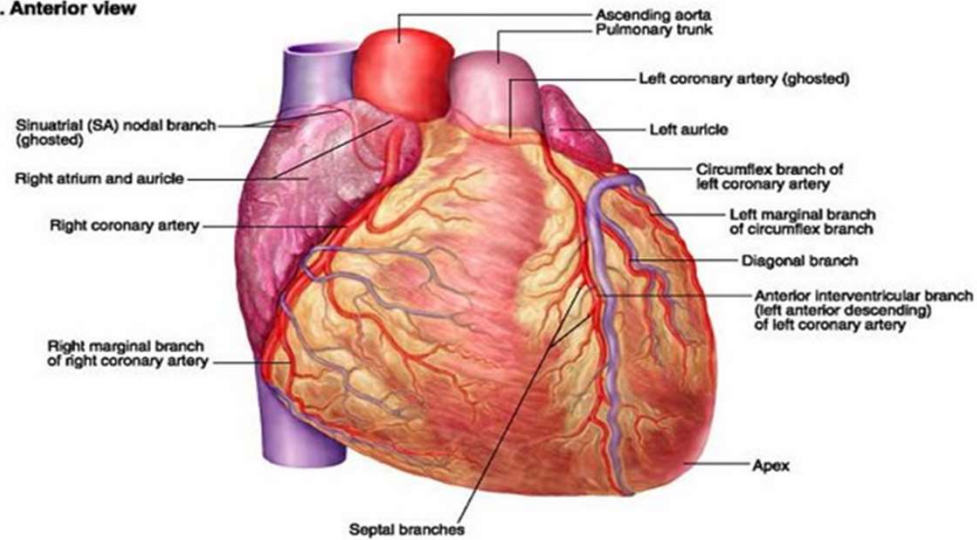
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(a) Anterior view

© The McGraw-Hill Companies, Inc./Photo and Dissection by Christine Eckel

A. Anterior view



B. Posteroinferior view

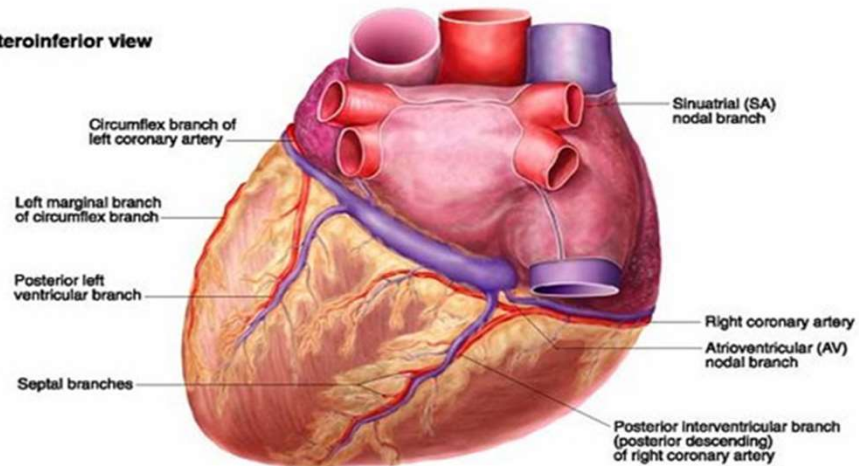
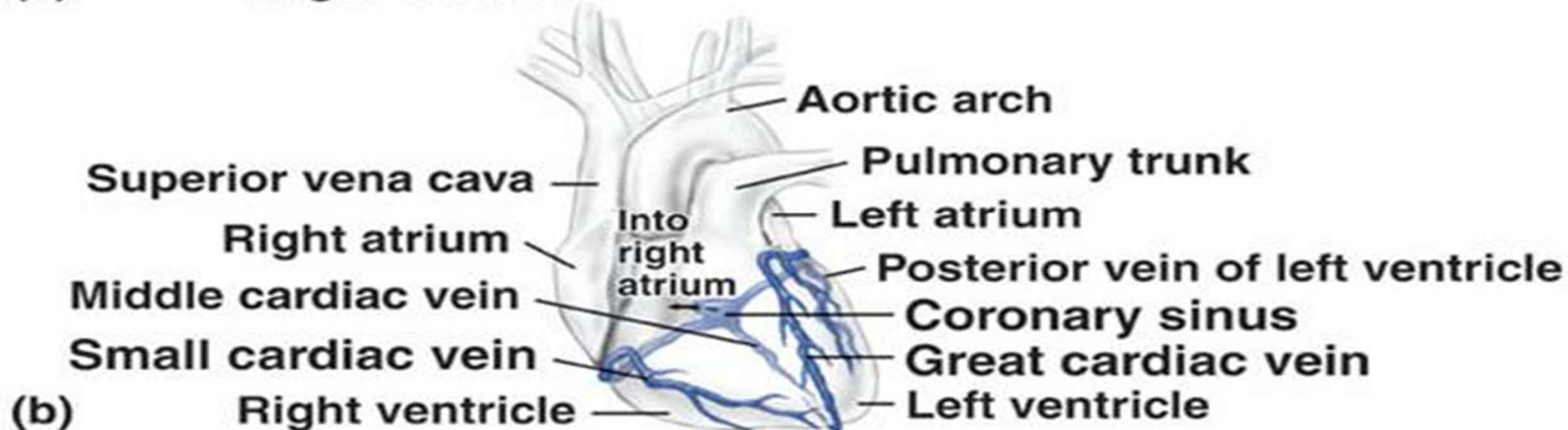
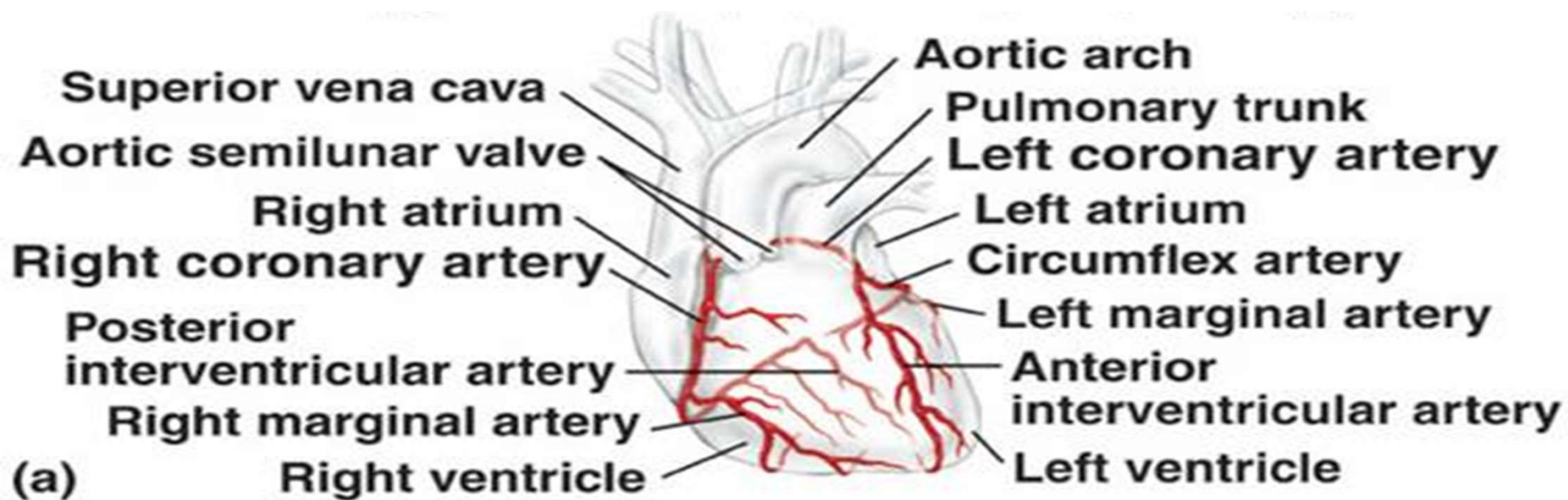
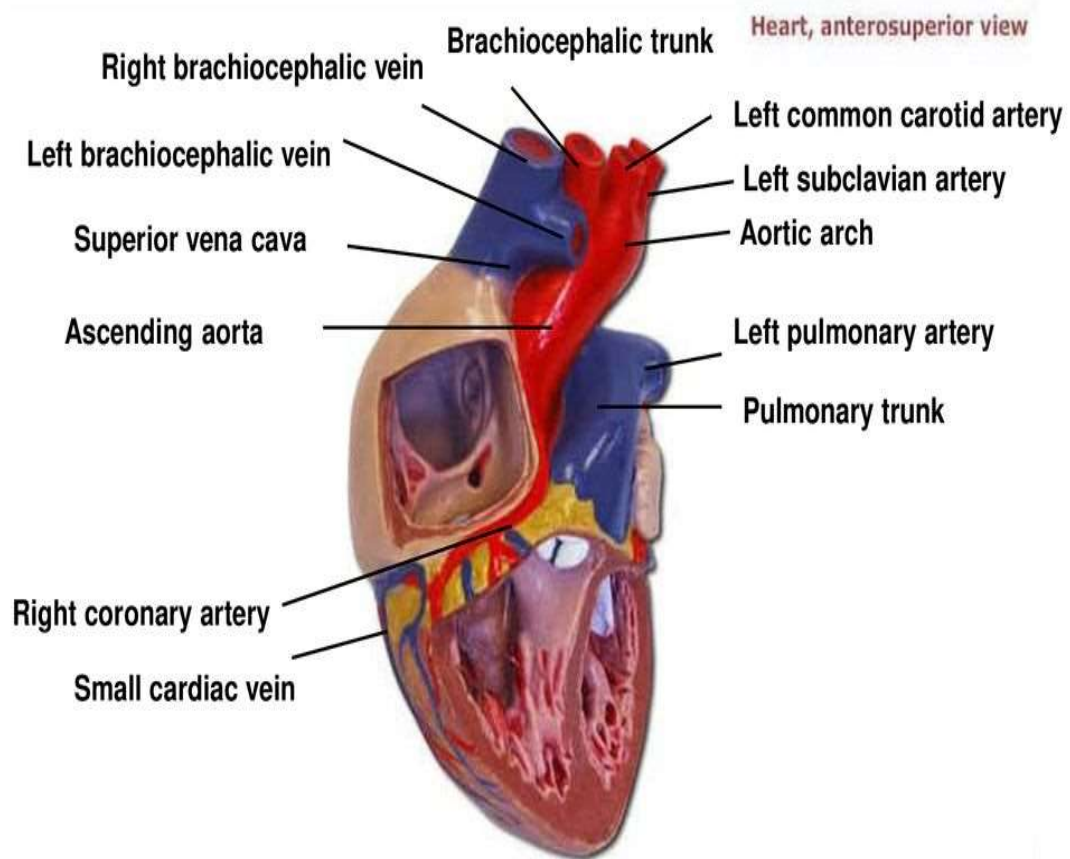
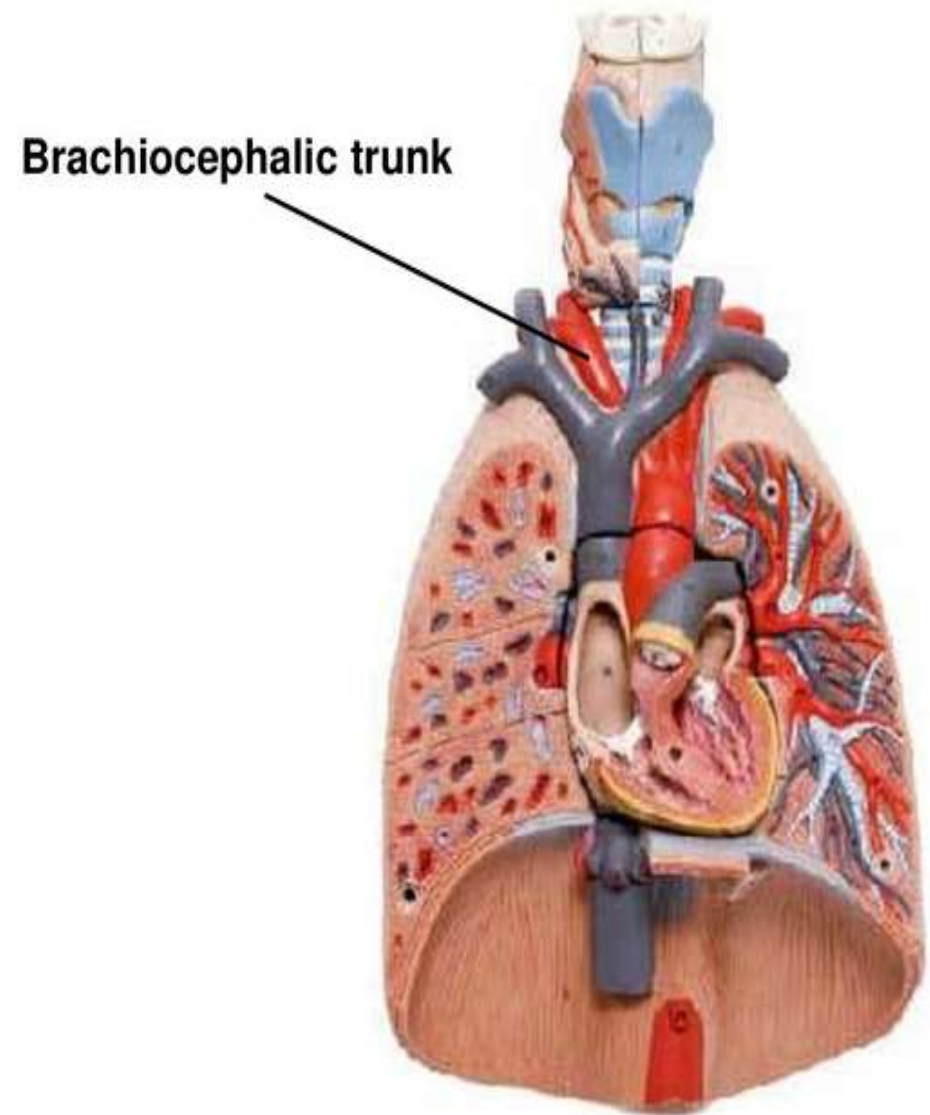


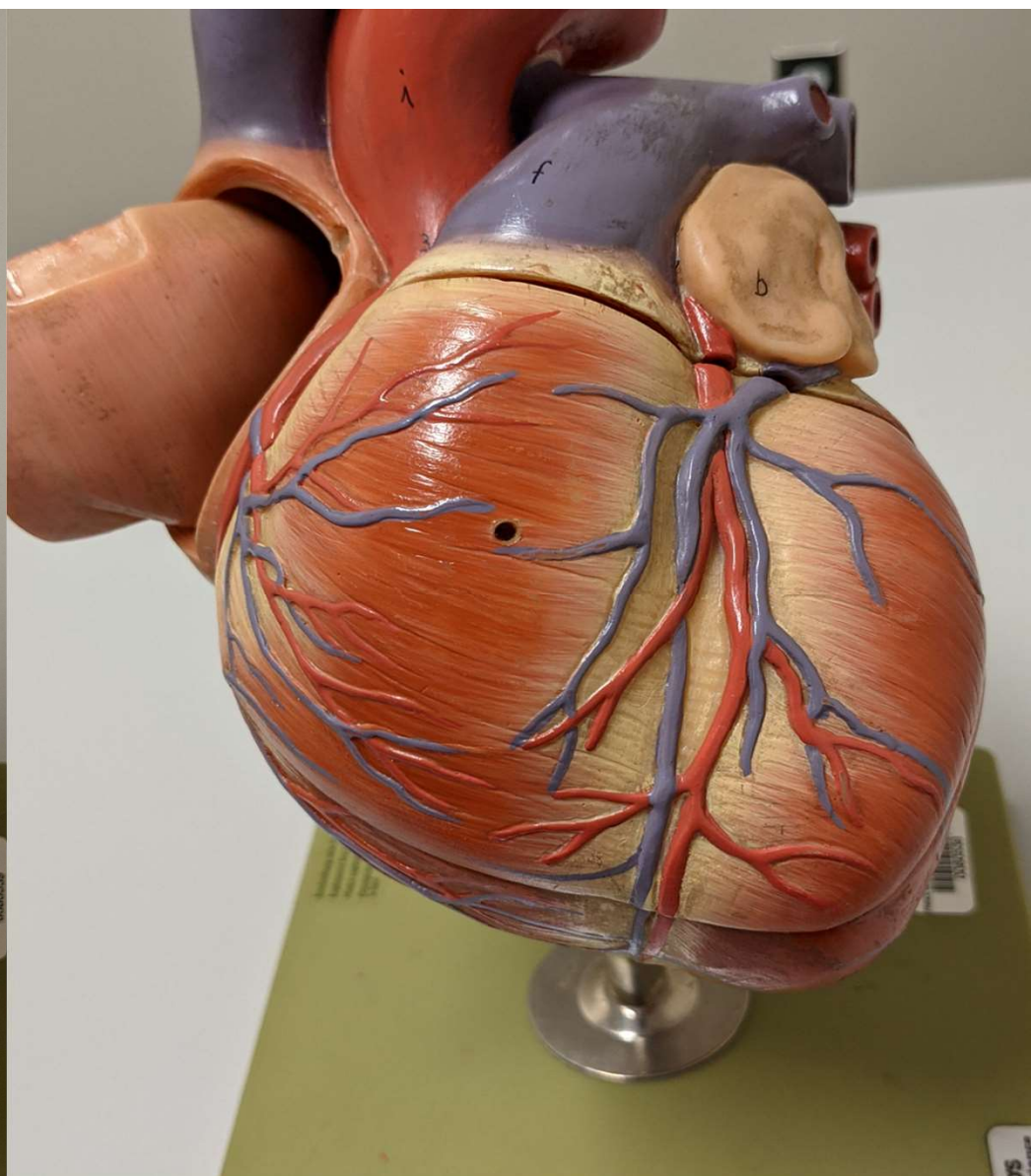
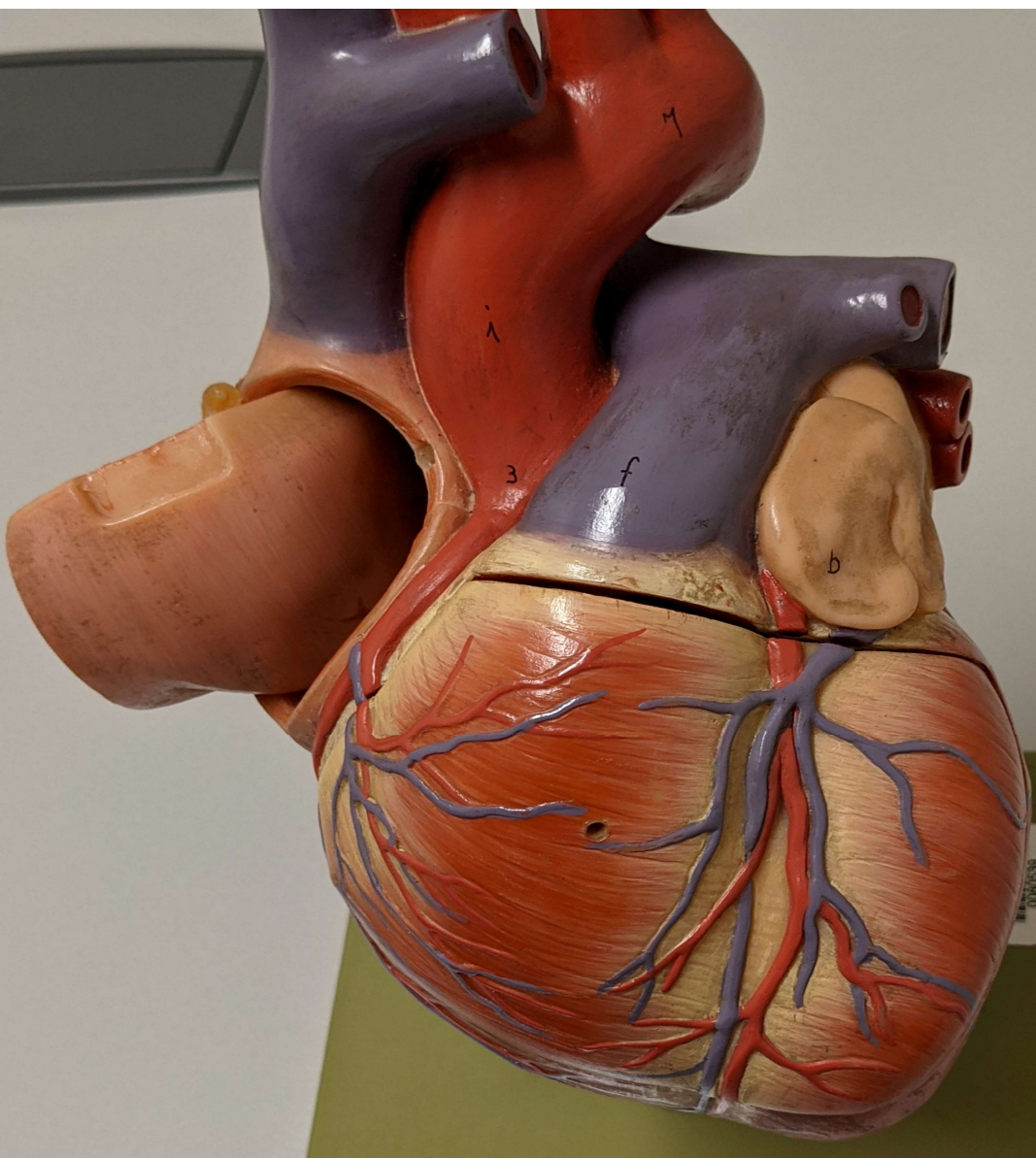
Plate 4-22 Coronary Arteries



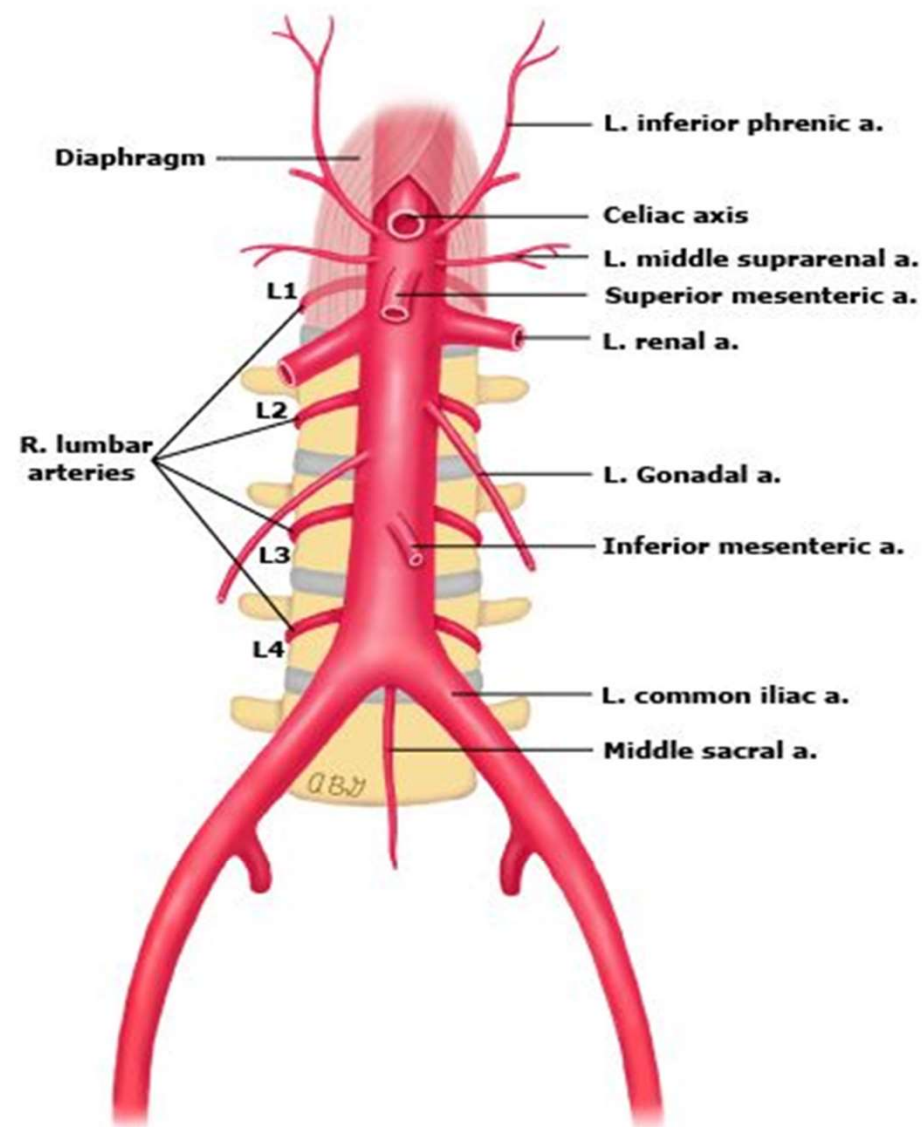
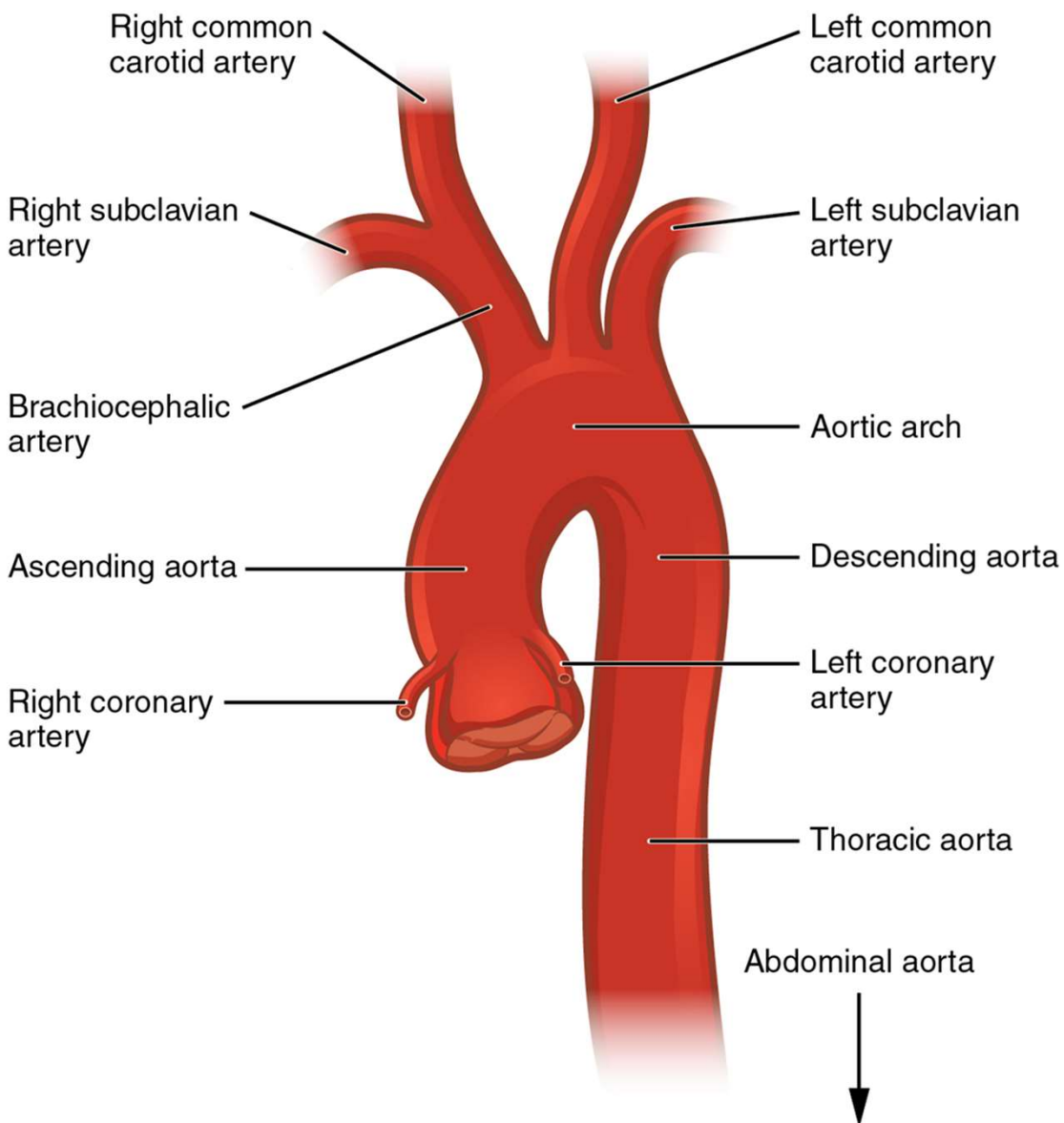


17-012: Giant Heart, 4-part, 38 Scientific®





The aorta



Willis circle

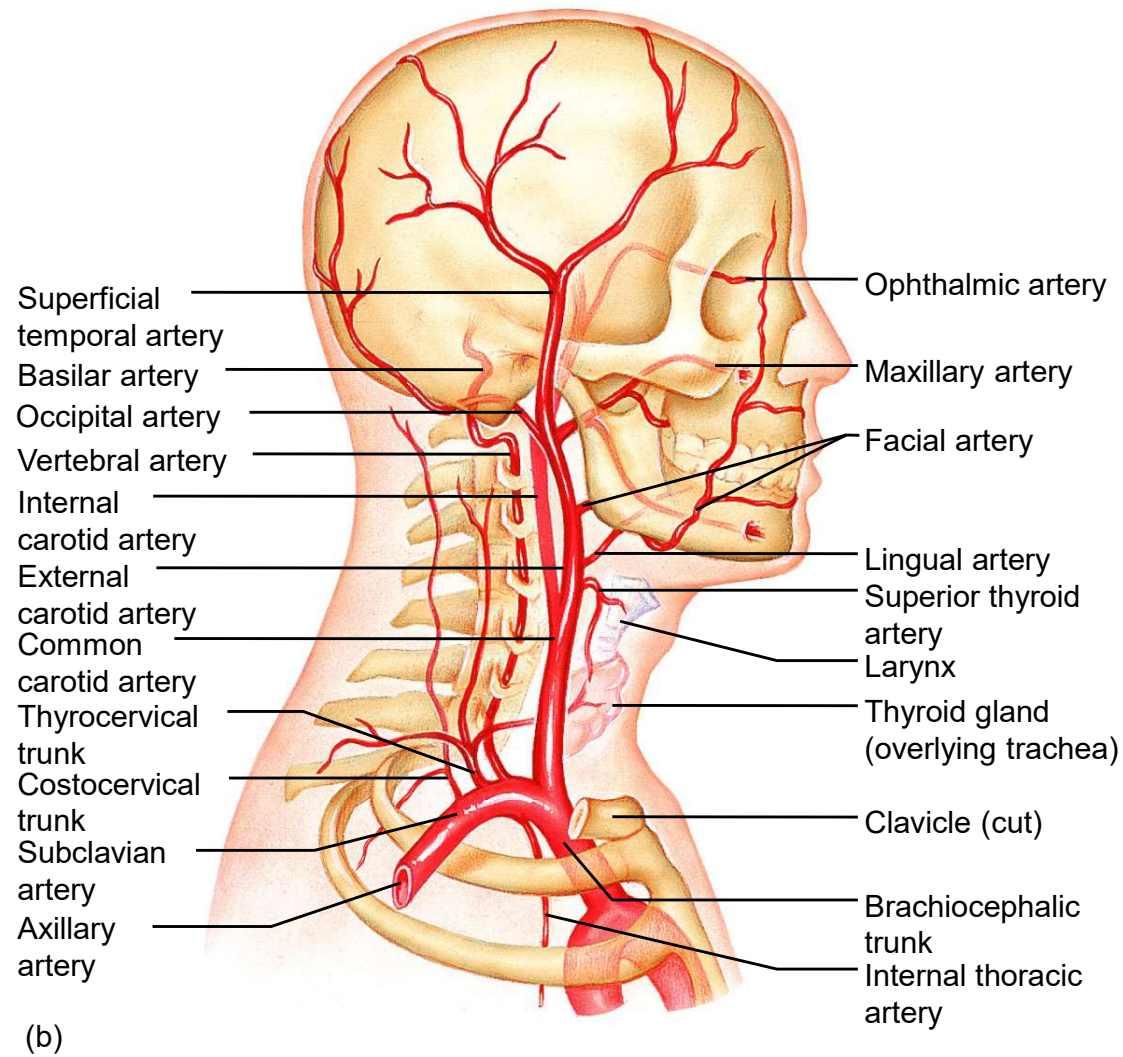
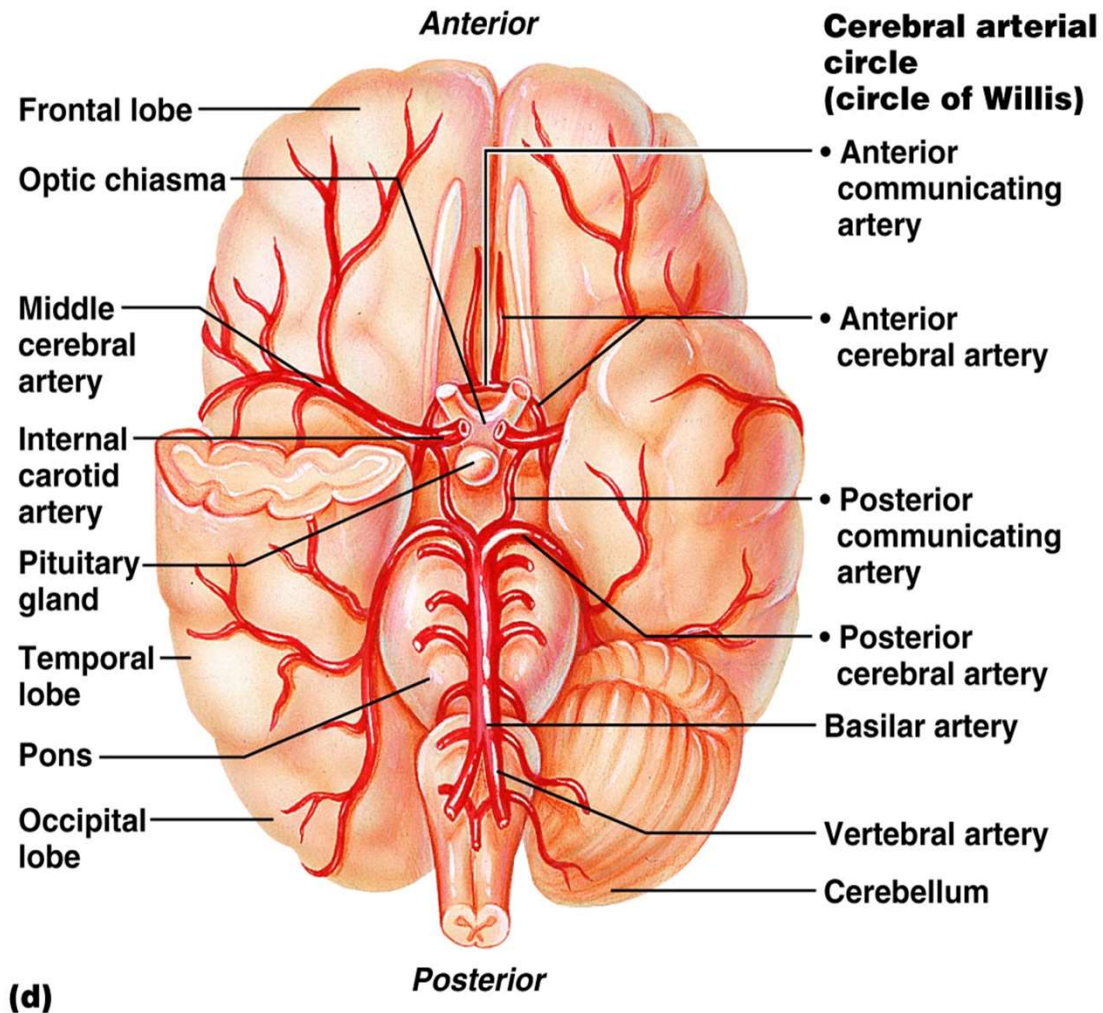
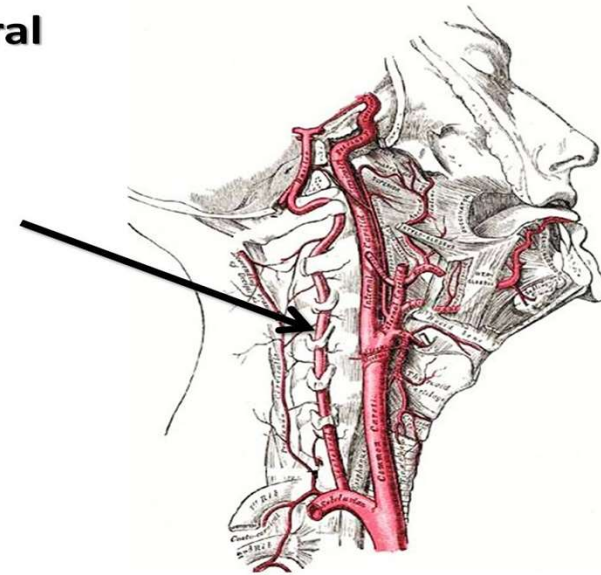


Figure 19.21b

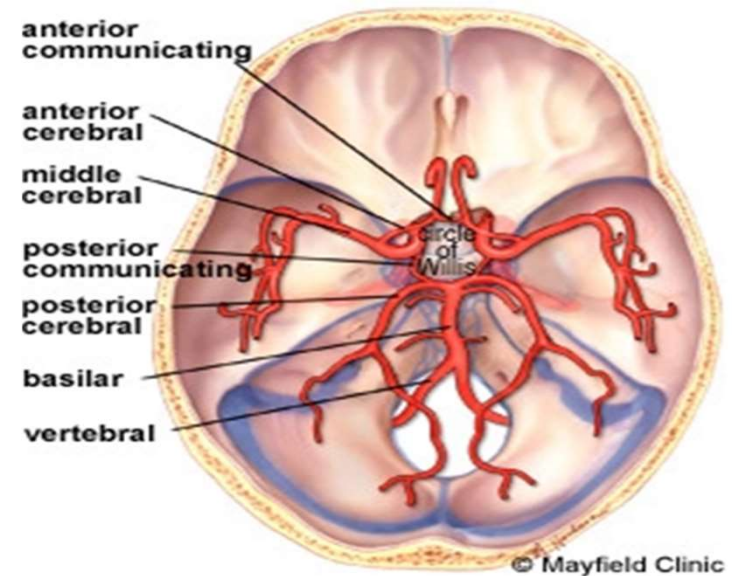


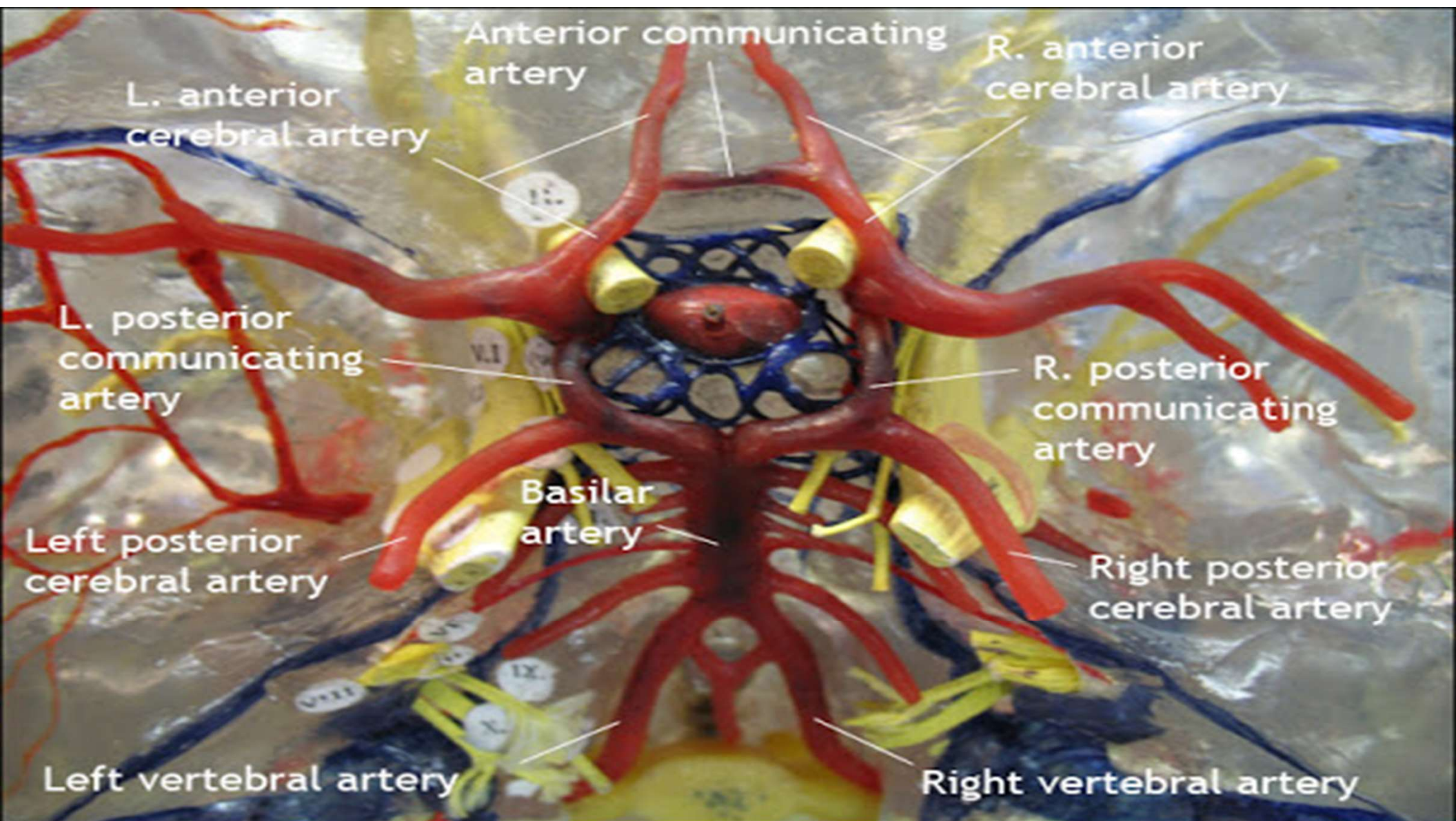
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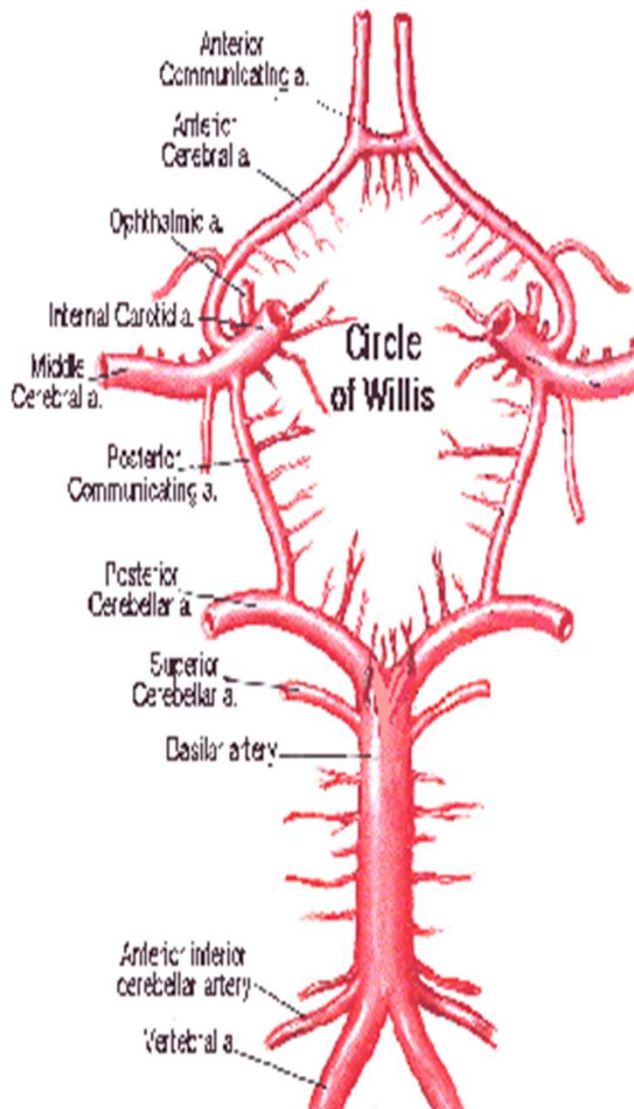
Right Vertebral Artery



10







ICA Internal Carotid A & branches (the ICA bifurcates into the ACA & MCA)

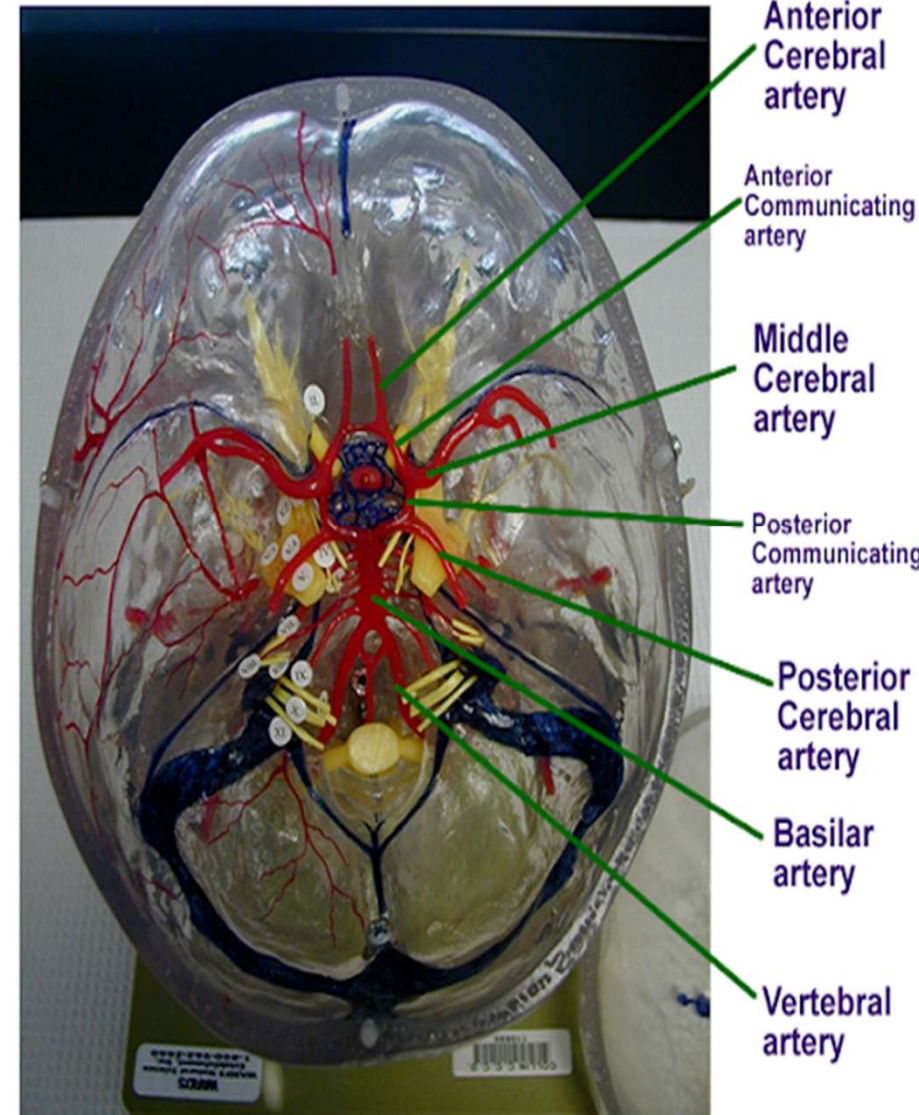
- ACA - Anterior cerebral artery
- A-Com - Anterior communicating Artery
- MCA - Middle cerebral artery
- P-Com - Posterior communicating artery

VA Vertebral artery (the left and right vertebral arteries join to form the basilar artery)

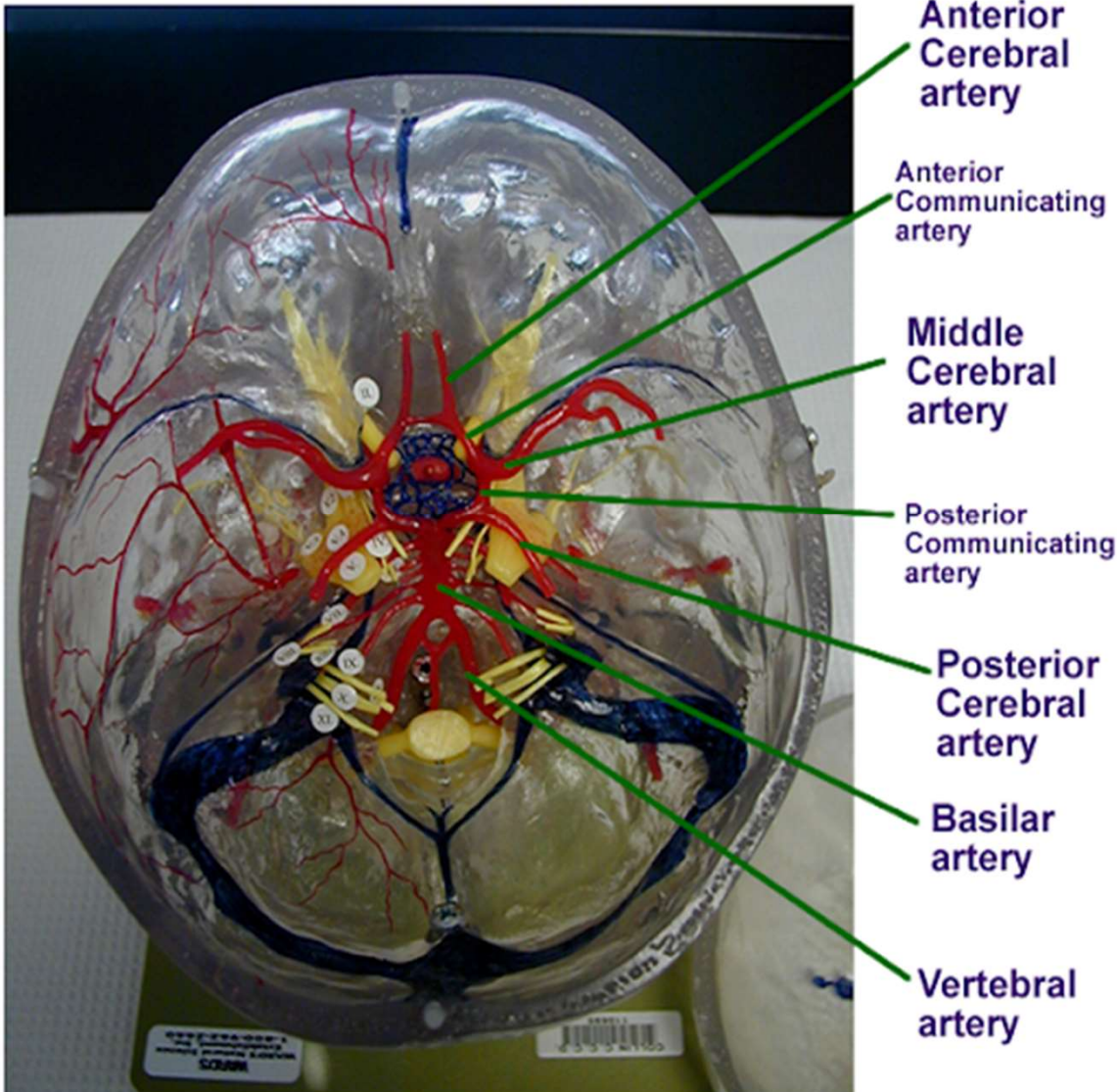
Basilar artery & its branches

- PCA - Posterior cerebral artery
- SCA - Superior cerebellar artery
- PICA - Posterior inferior cerebellar artery

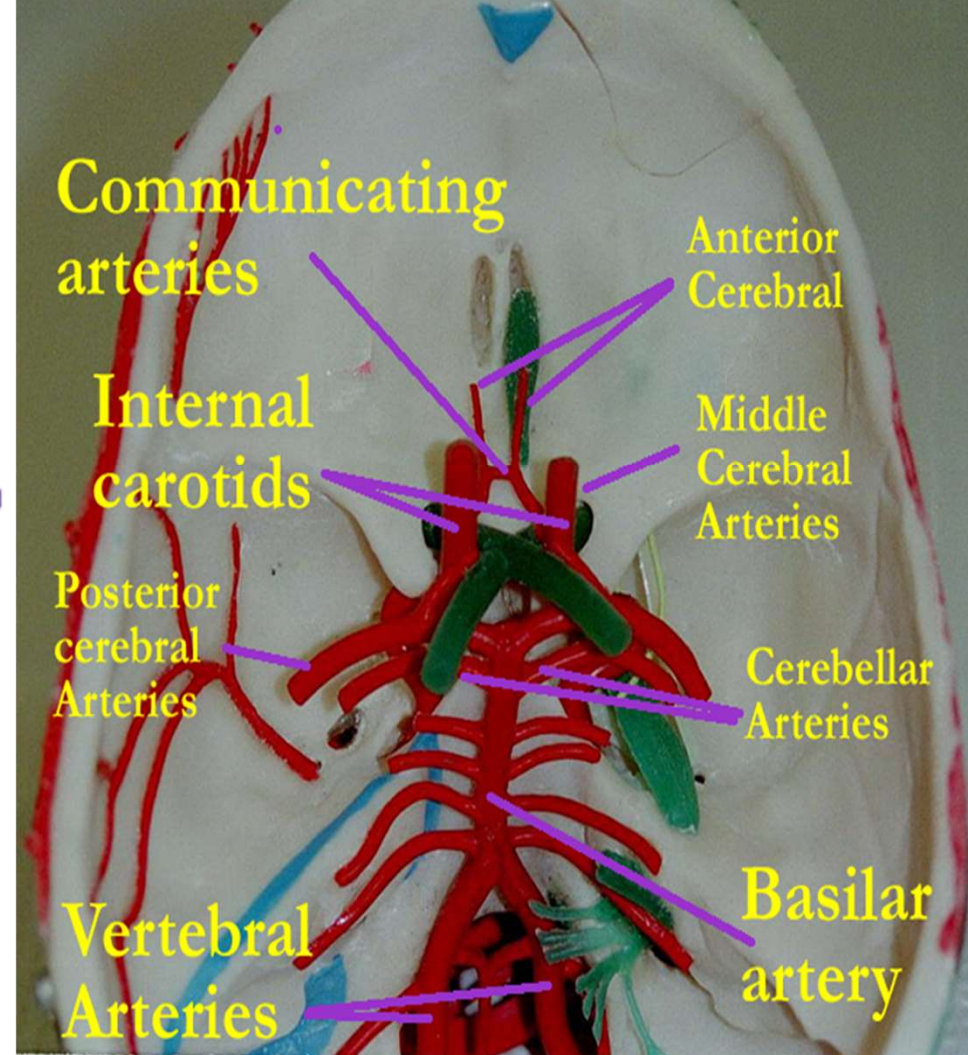
Circle of Willis



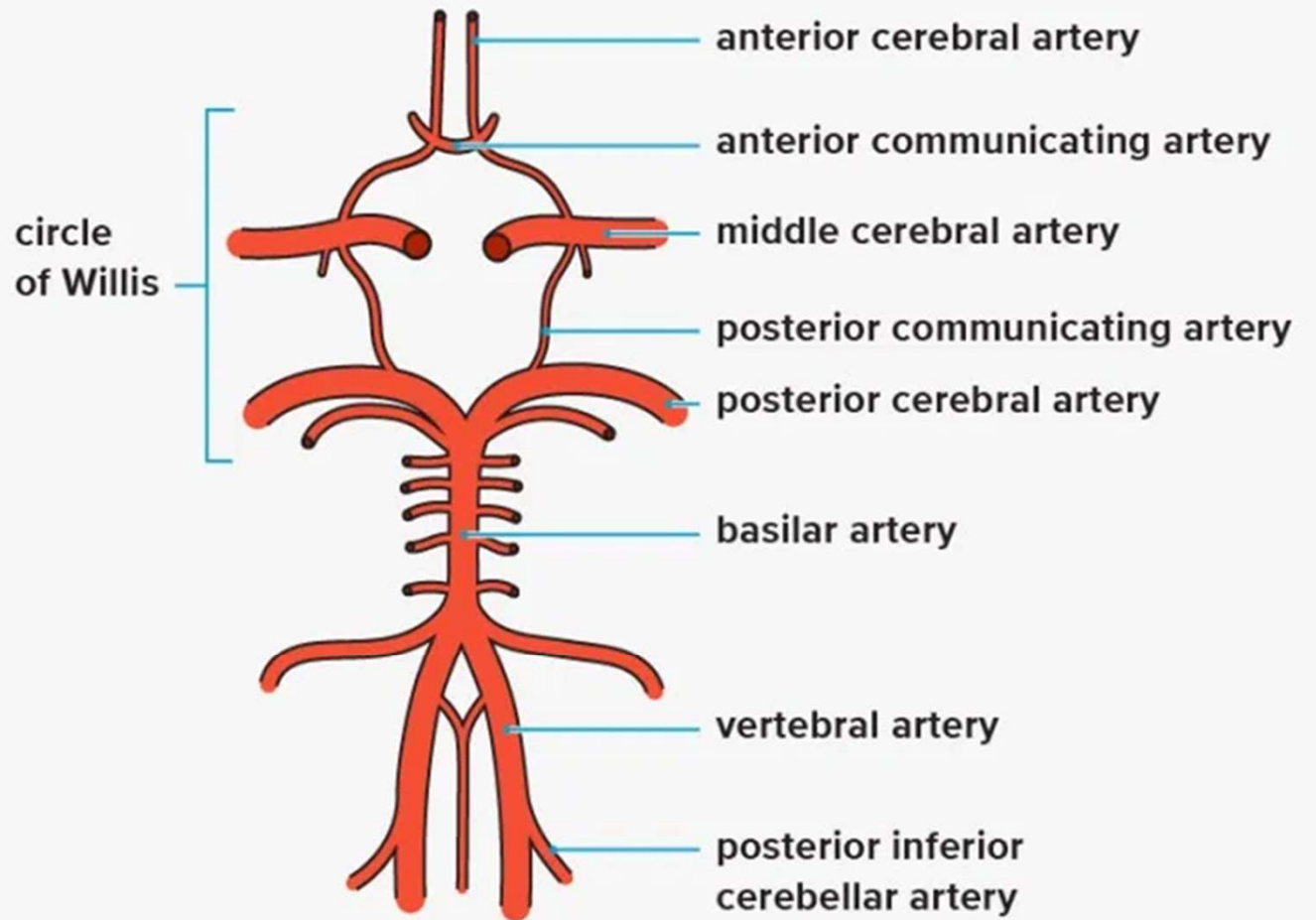
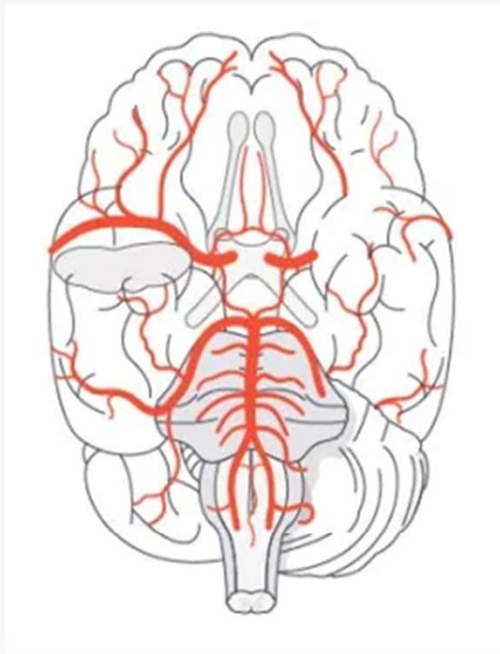
Circle of Willis

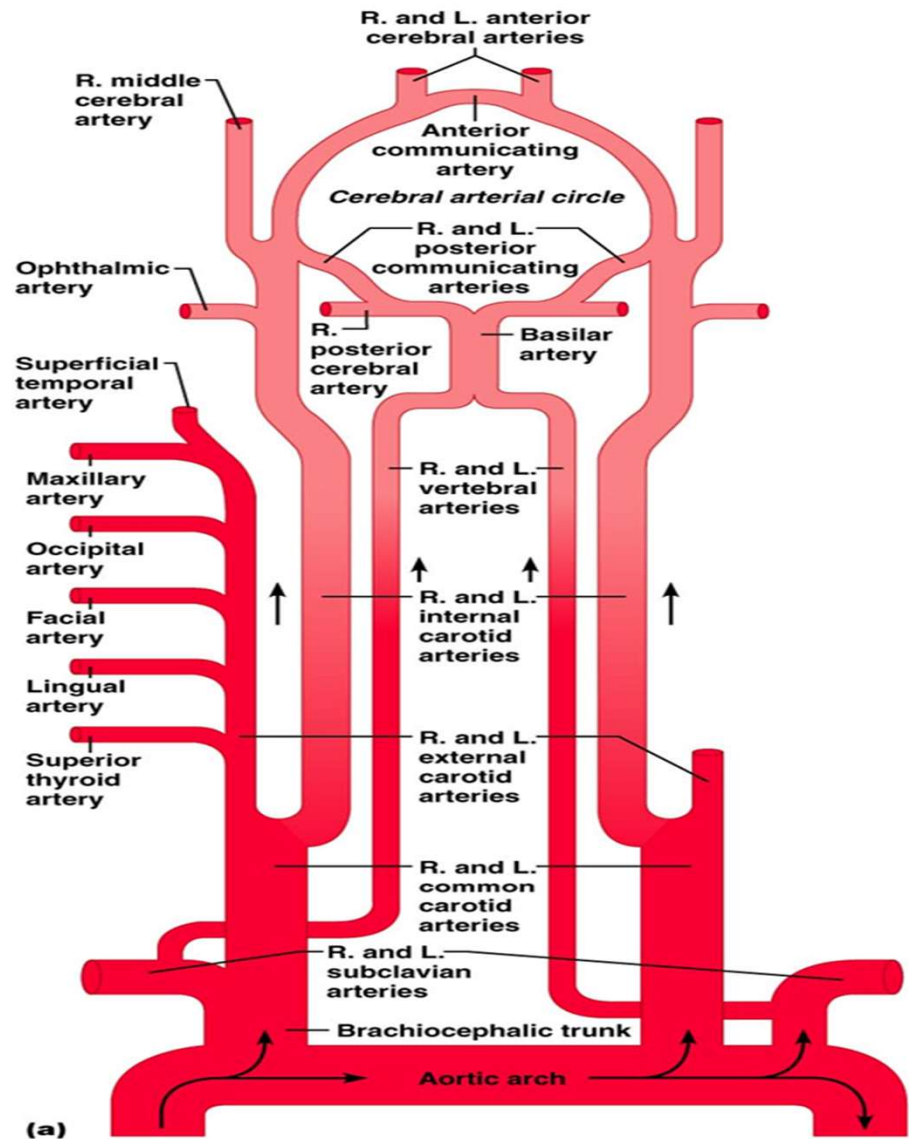
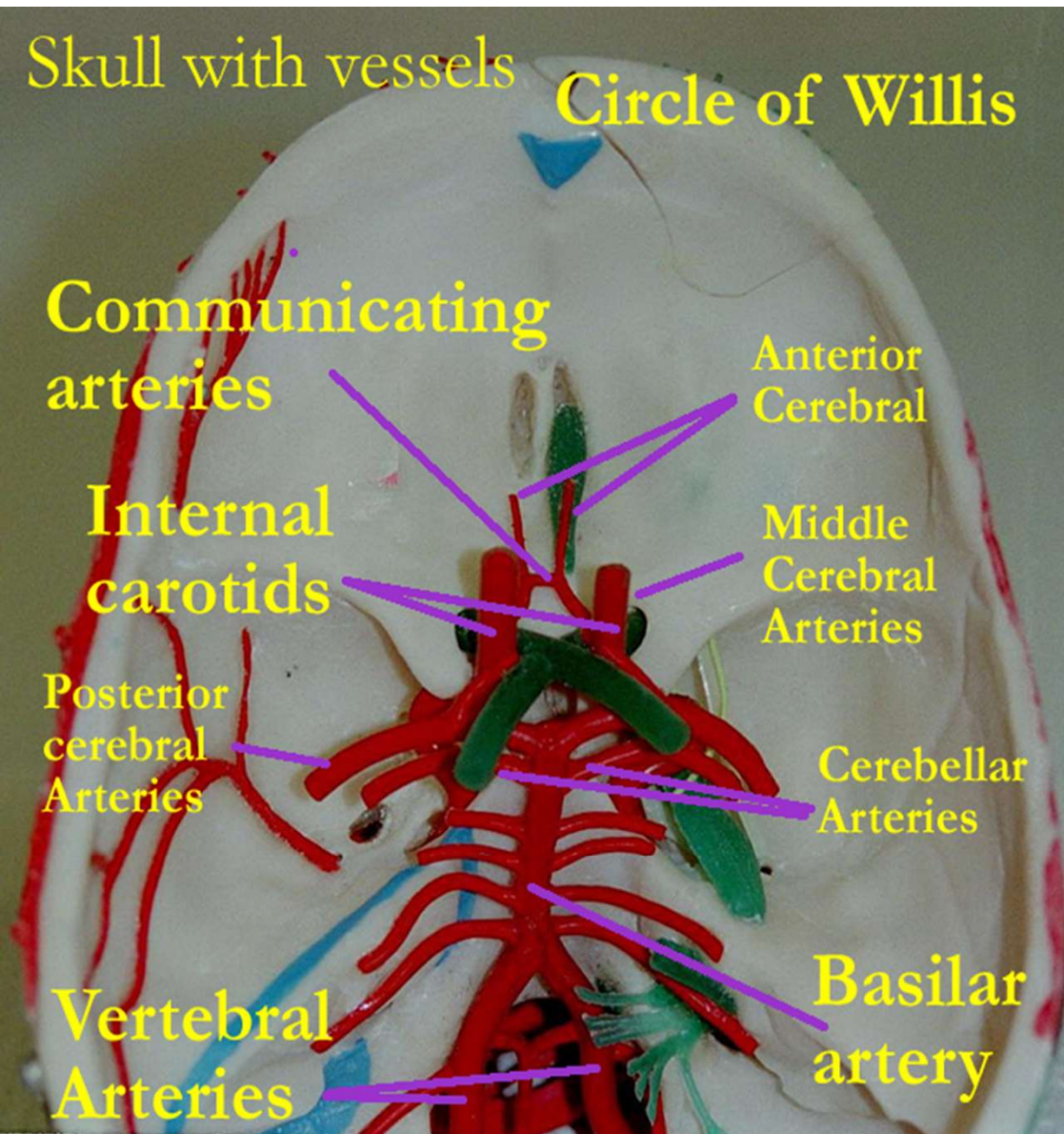


Skull with vessels Circle of Willis



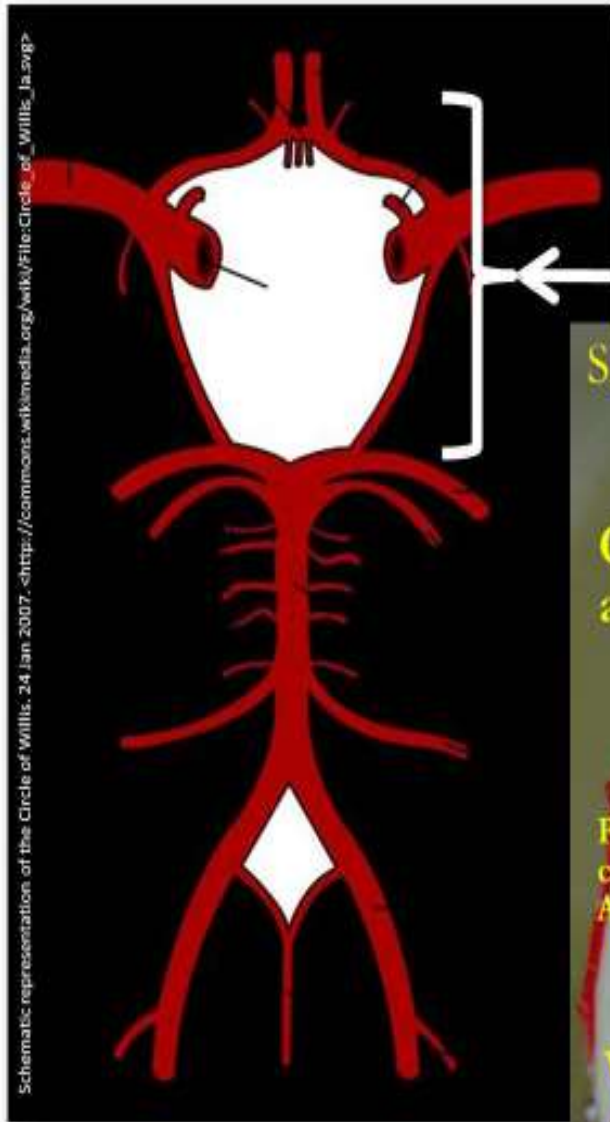
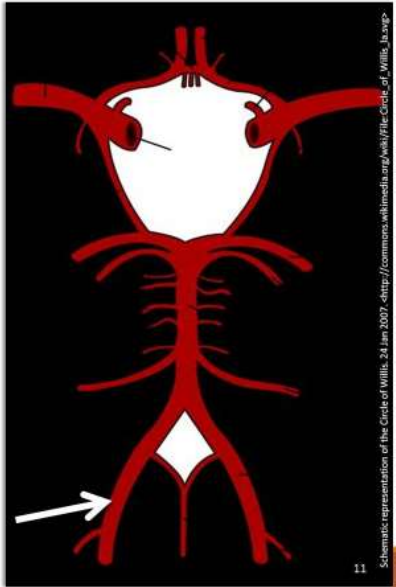
Circle of Willis



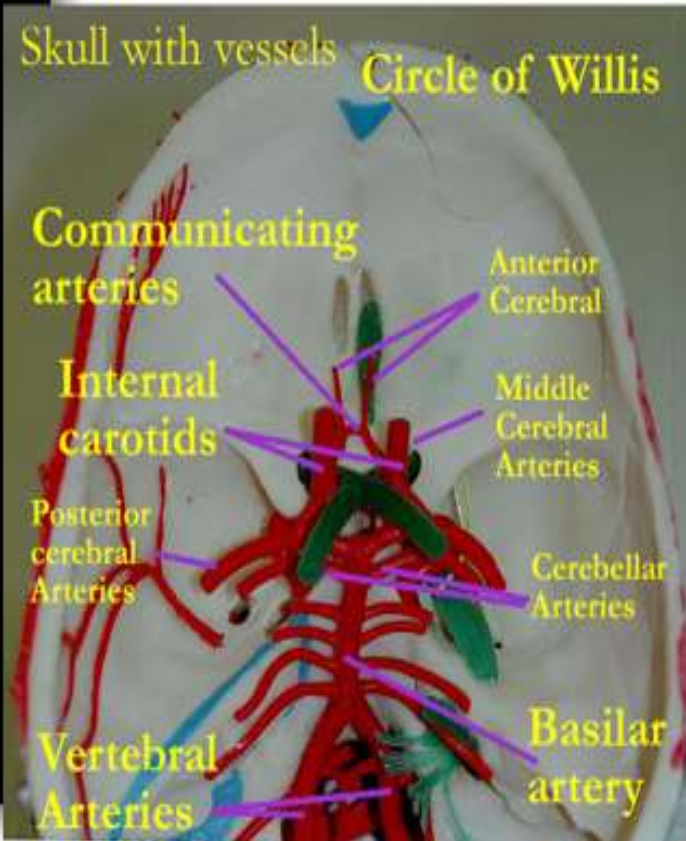


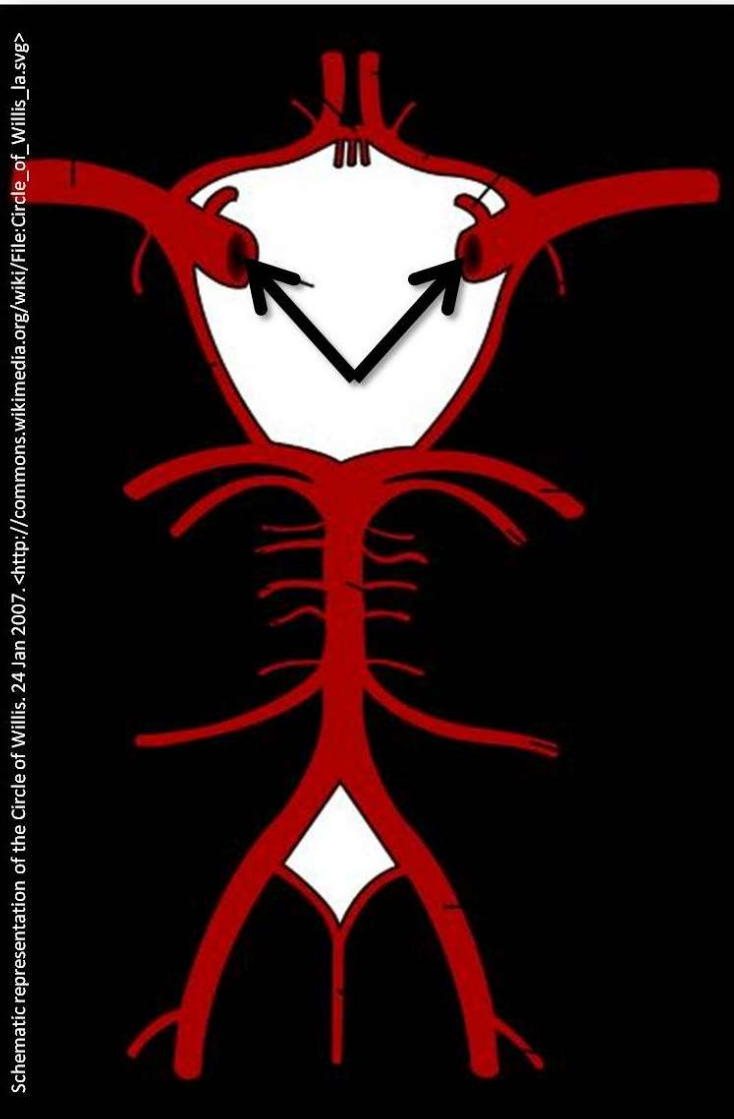
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Right Vertebral Artery



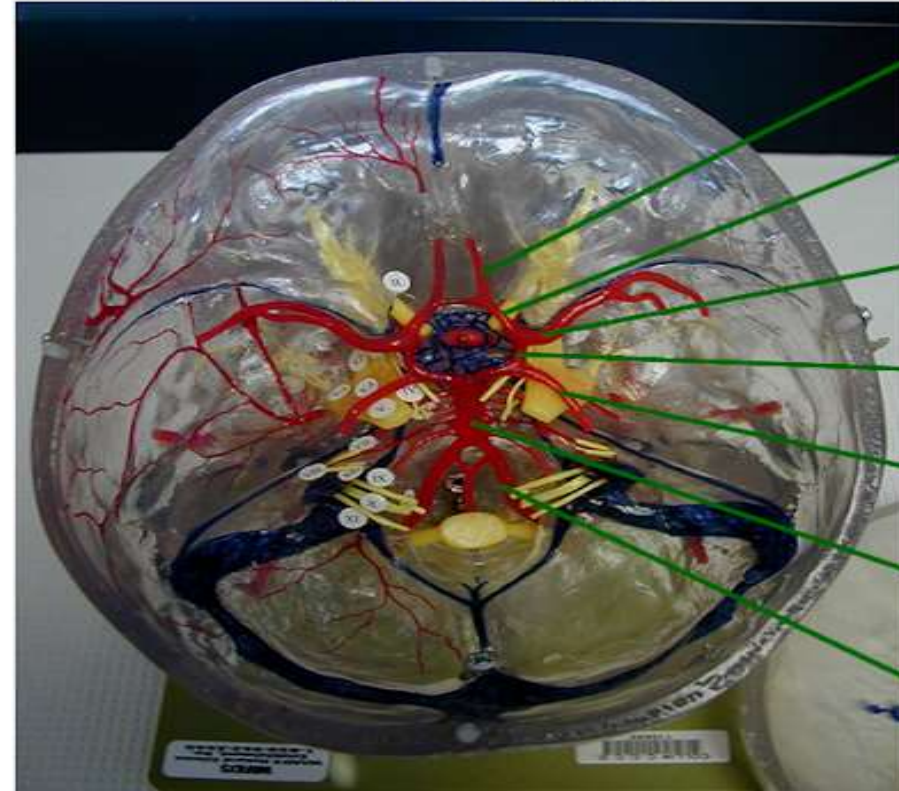
Circle of Willis





Right and Left Internal Carotid Arteries

Circle of Willis



Anterior
Cerebral
artery

Anterior
Communicating
artery

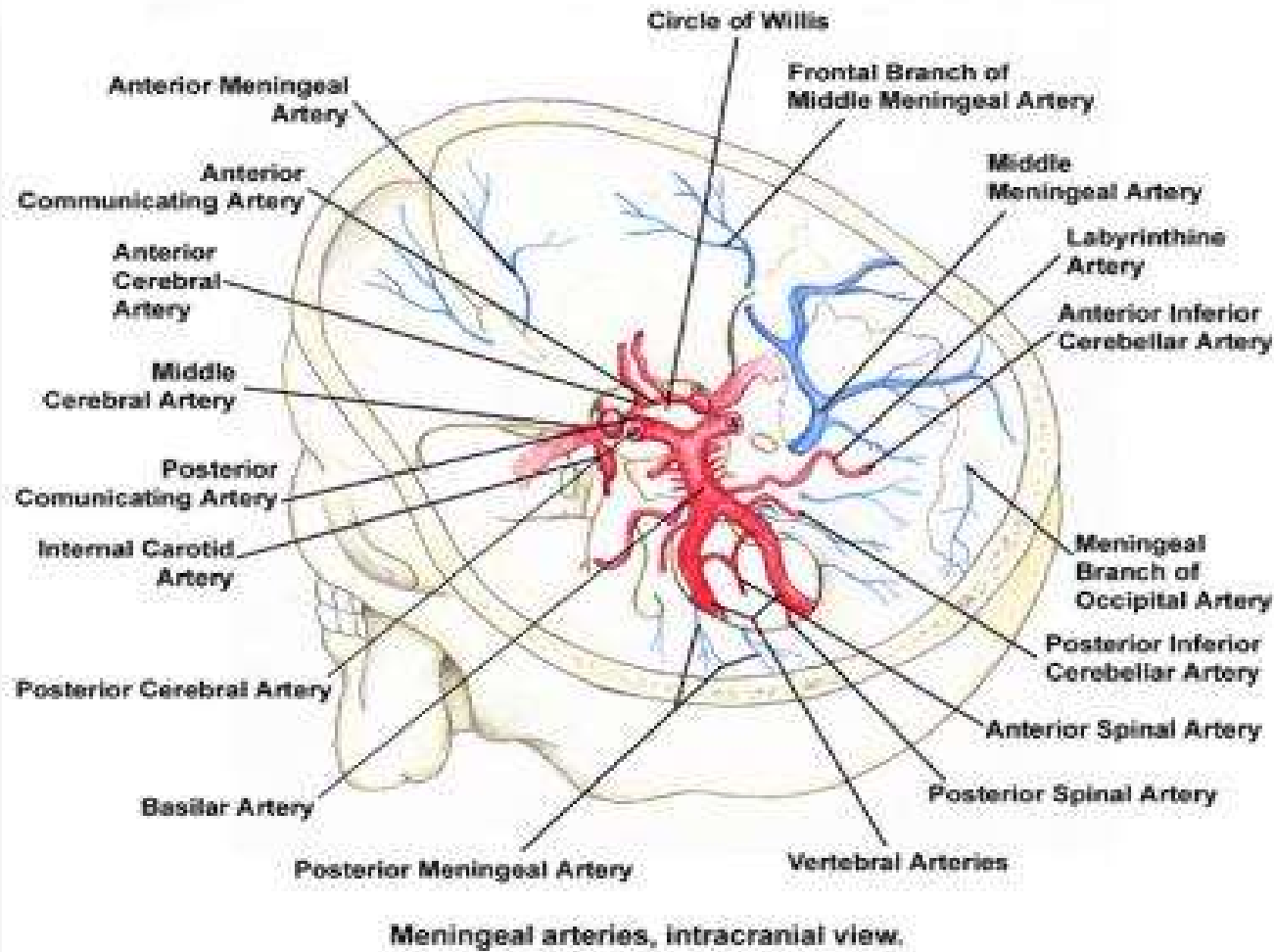
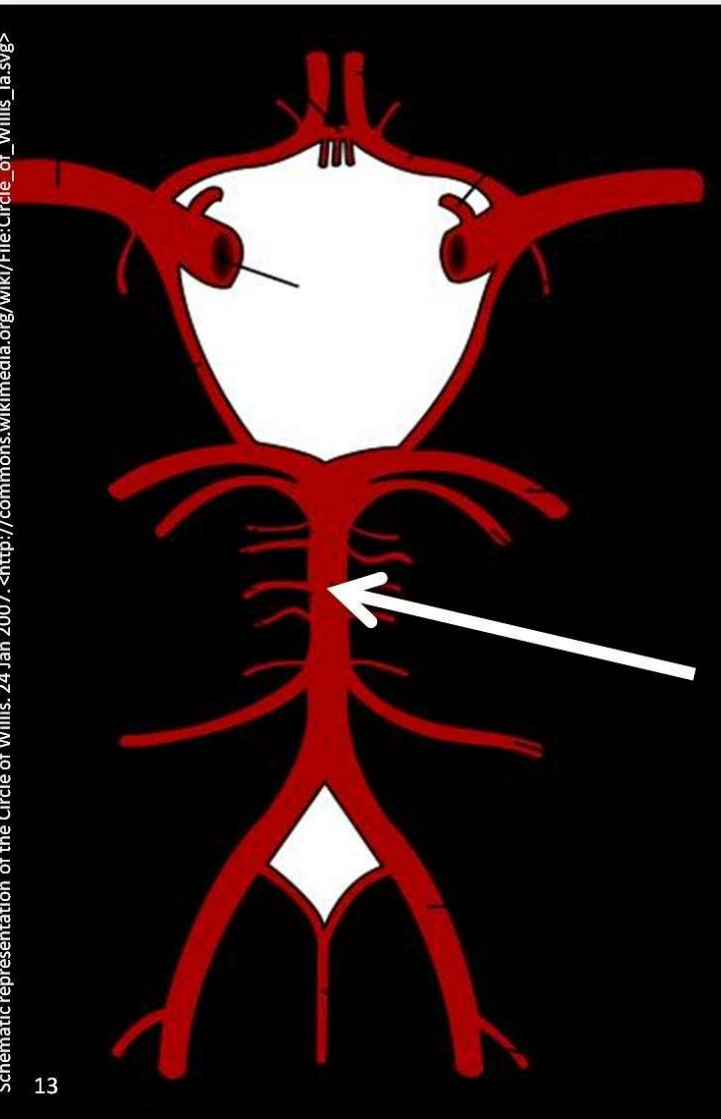
Middle
Cerebral
artery

Posterior
Communicating
artery

Posterior
Cerebral
artery

Basilar
artery

Vertebral
artery

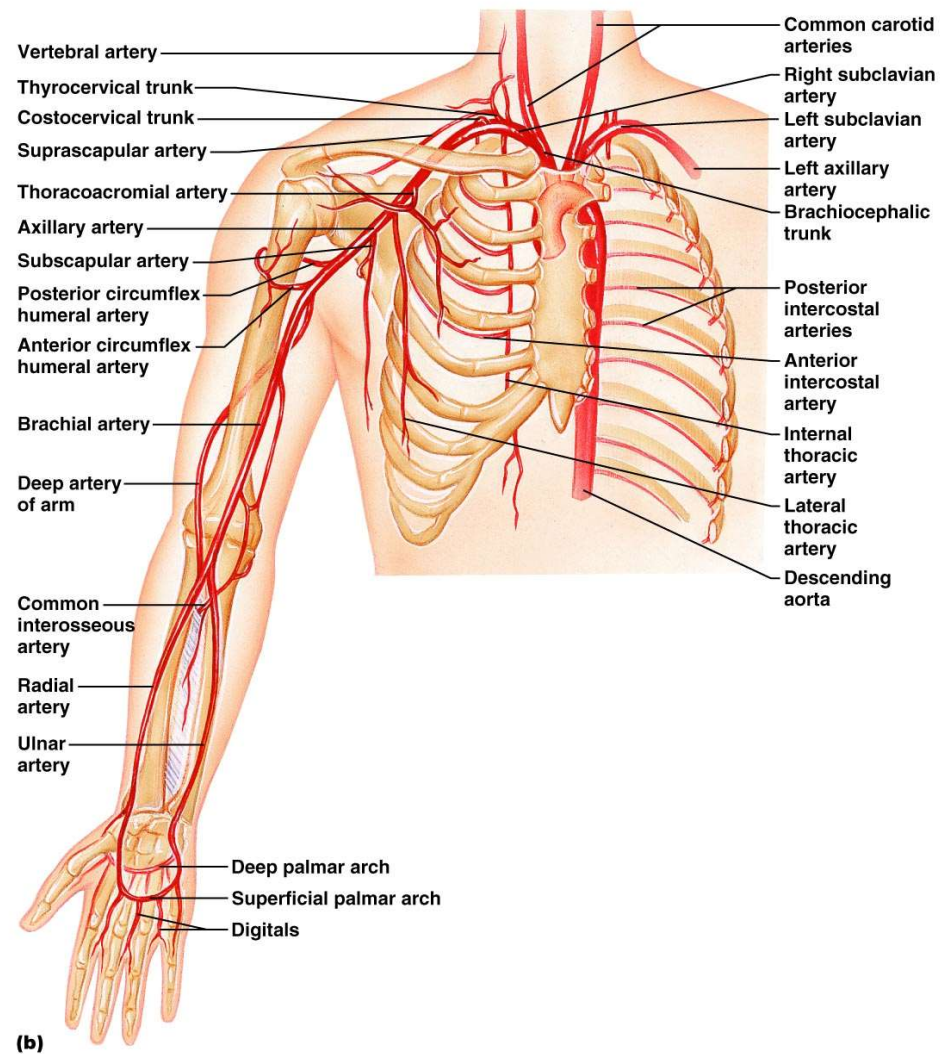


Basilar Artery

This diagram illustrates the arterial system of the upper limb and its connection to the thoracic and cervical arteries. The central feature is the **Aortic arch**, which gives rise to the **brachiocephalic trunk**, **left common carotid artery**, and **descending thoracic aorta**. The **brachiocephalic trunk** divides into the **right common carotid artery** and **right subclavian artery**. The **right subclavian artery** gives off the **thoracoacromial artery** and continues as the **axillary artery**, which then becomes the **brachial artery**. The **brachial artery** divides into the **radial artery** and **ulnar artery**, which eventually form the **superficial palmar arch** and **deep palmar arch**, leading to the **metacarpal arteries** and **digital arteries**. The **descending thoracic aorta** gives off **anterior intercostal arteries** and **posterior intercostal arteries**. The **brachiocephalic trunk** also gives off the **internal thoracic artery**. The **axillary artery** gives off the **superior thoracic artery** and **anterior and posterior circumflex humeral arteries**. The **brachial artery** gives off the **deep artery of arm**. The **ulnar artery** gives off the **subscapular artery** and **common interosseous artery**, which divides into the **anterior interosseous artery** and **lateral thoracic artery**. The **anastomosis** between the **axillary artery** and **brachial artery** is shown. The **radial artery** gives off the **deep palmar arch** and **superficial palmar arch**. The **ulnar artery** gives off the **superficial palmar arch** and **deep palmar arch**. The **metacarpal arteries** and **digital arteries** are shown at the bottom.

(a)

(a)



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Figure 19.22b

VEINS
• Carry blood back to the heart

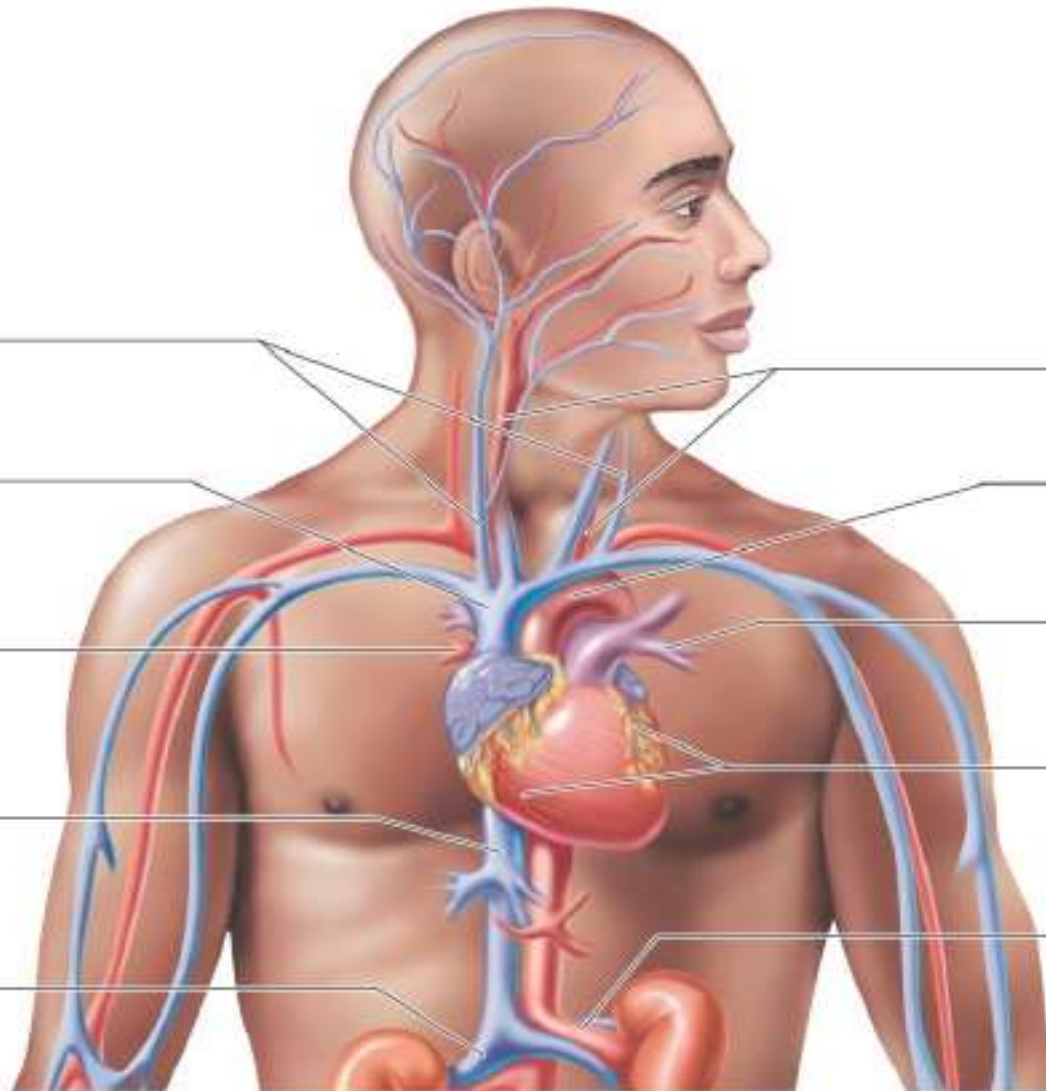
JUGULAR VEINS
• Carry blood from head to the heart

SUPERIOR VENA CAVA
• Carries blood from the upper body back to the heart

PULMONARY VEINS
• Carry oxygenated blood from the lungs to the heart

INFERIOR VENA CAVA
• Carries blood from the lower body back to the heart

RENAL VEIN
• Carries blood from the kidneys to the heart



ARTERIES
• Carry blood away from heart

CAROTID ARTERIES
• Deliver blood to the head and the brain

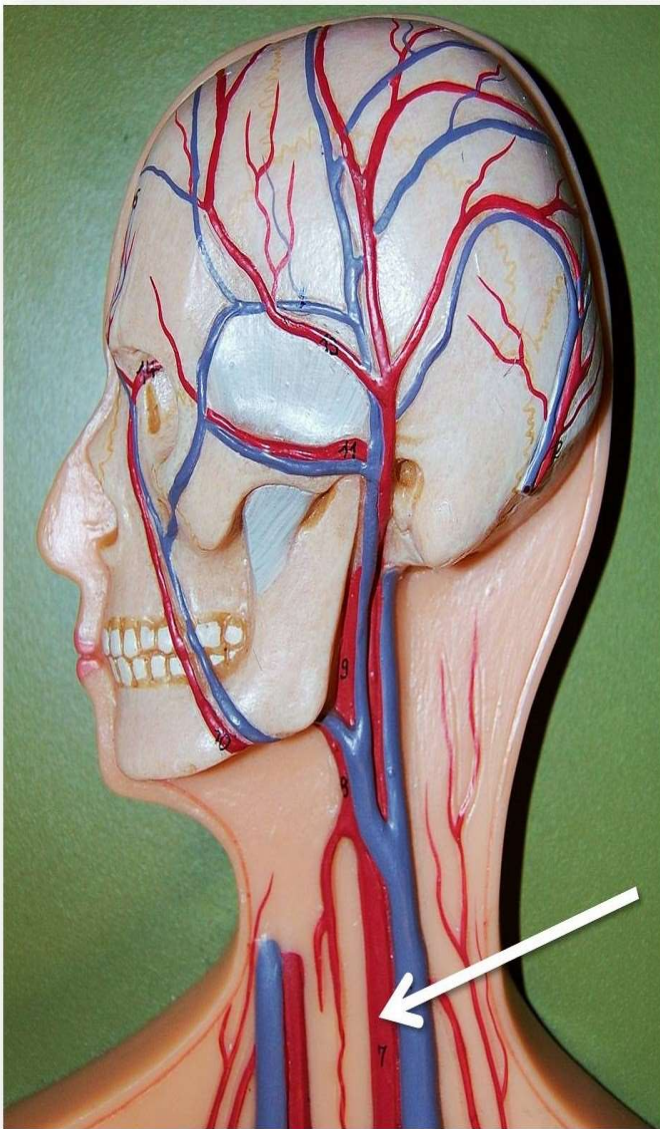
AORTA
• Deliver blood to the body tissues

PULMONARY ARTERIES
• Deliver deoxygenated blood to the lungs

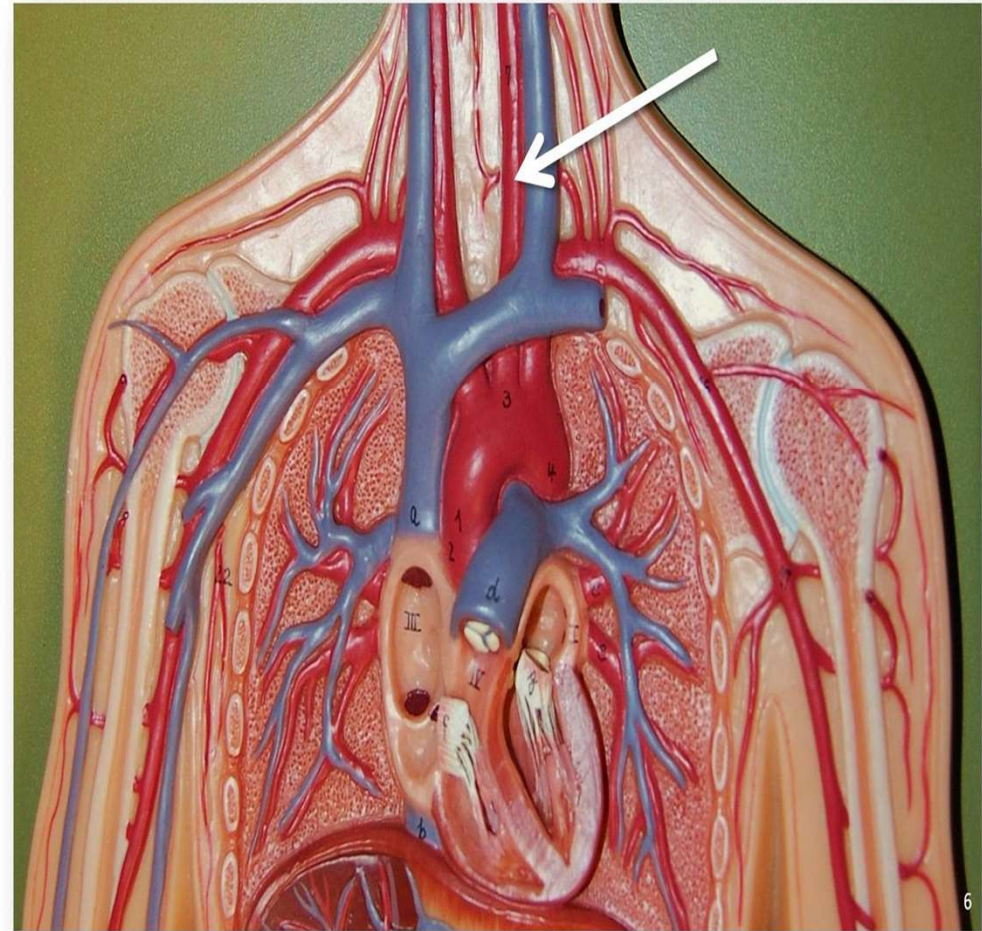
CORONARY ARTERIES
• Deliver blood to the heart muscle cells

RENAL ARTERY
• Delivers blood to the kidney

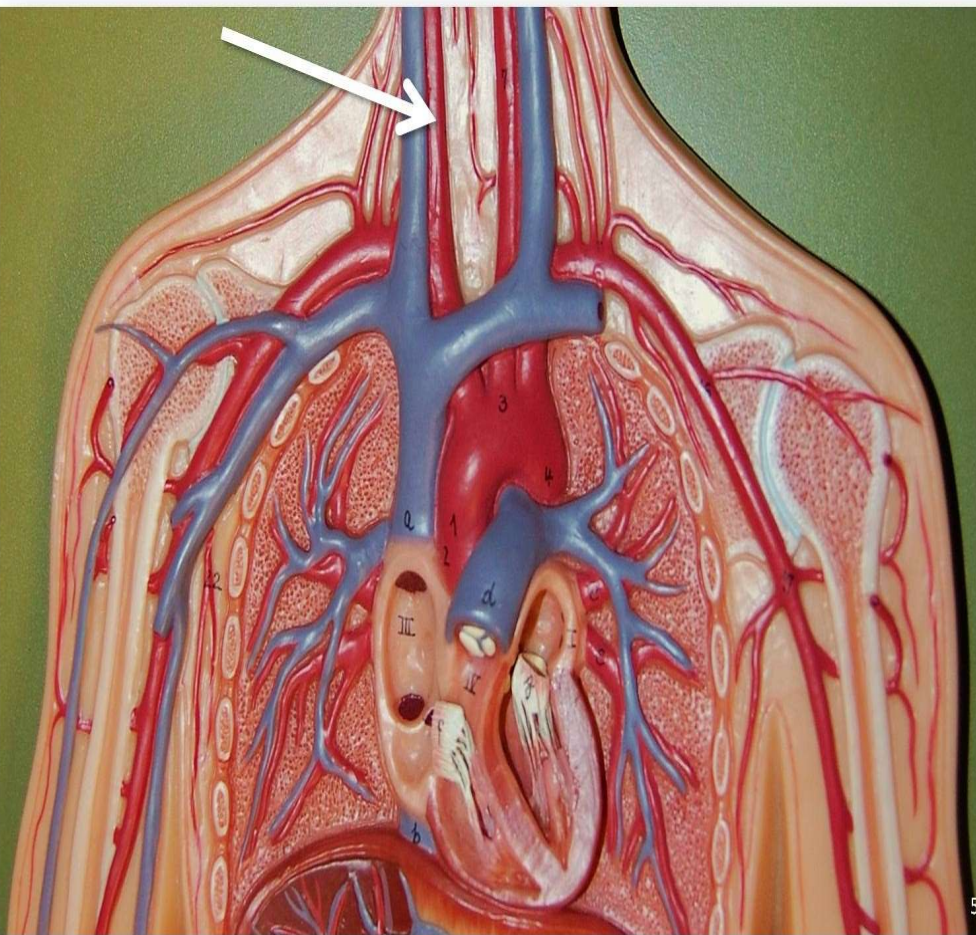
**Left Common
Carotid Artery**



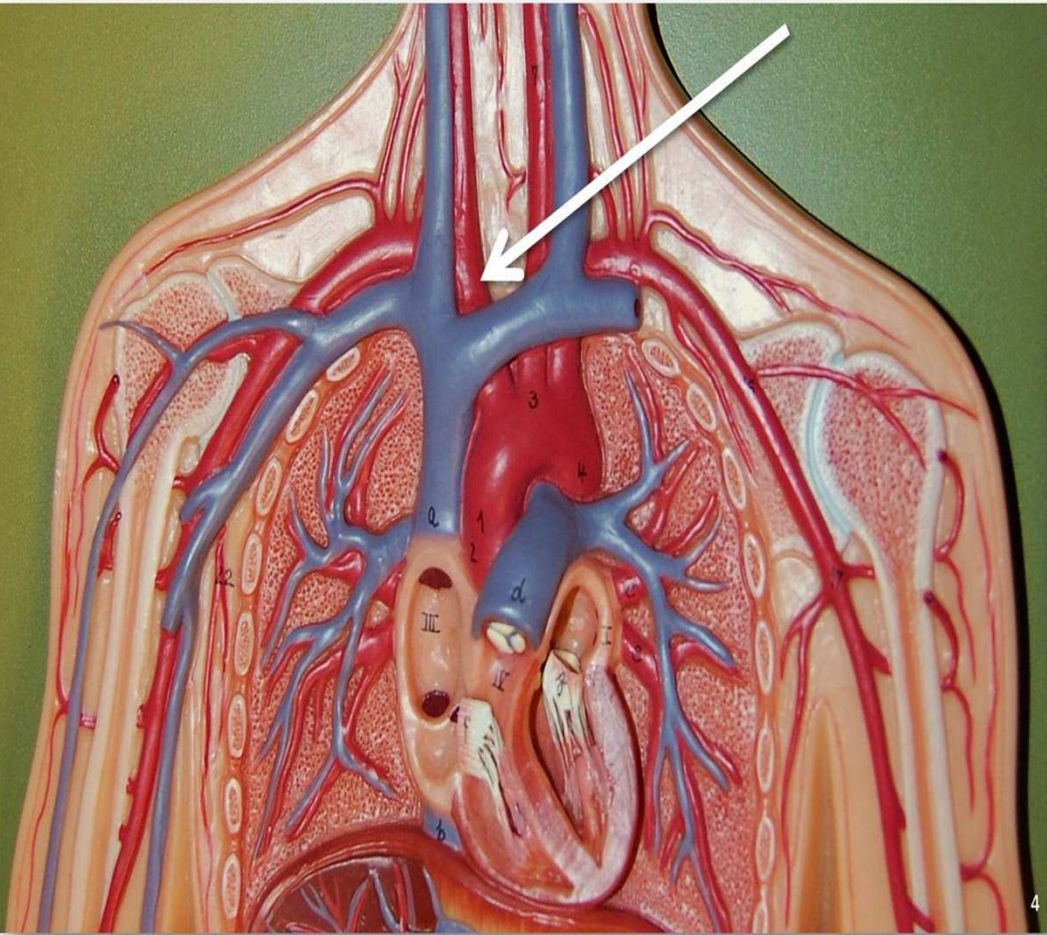
Left Common Carotid Artery



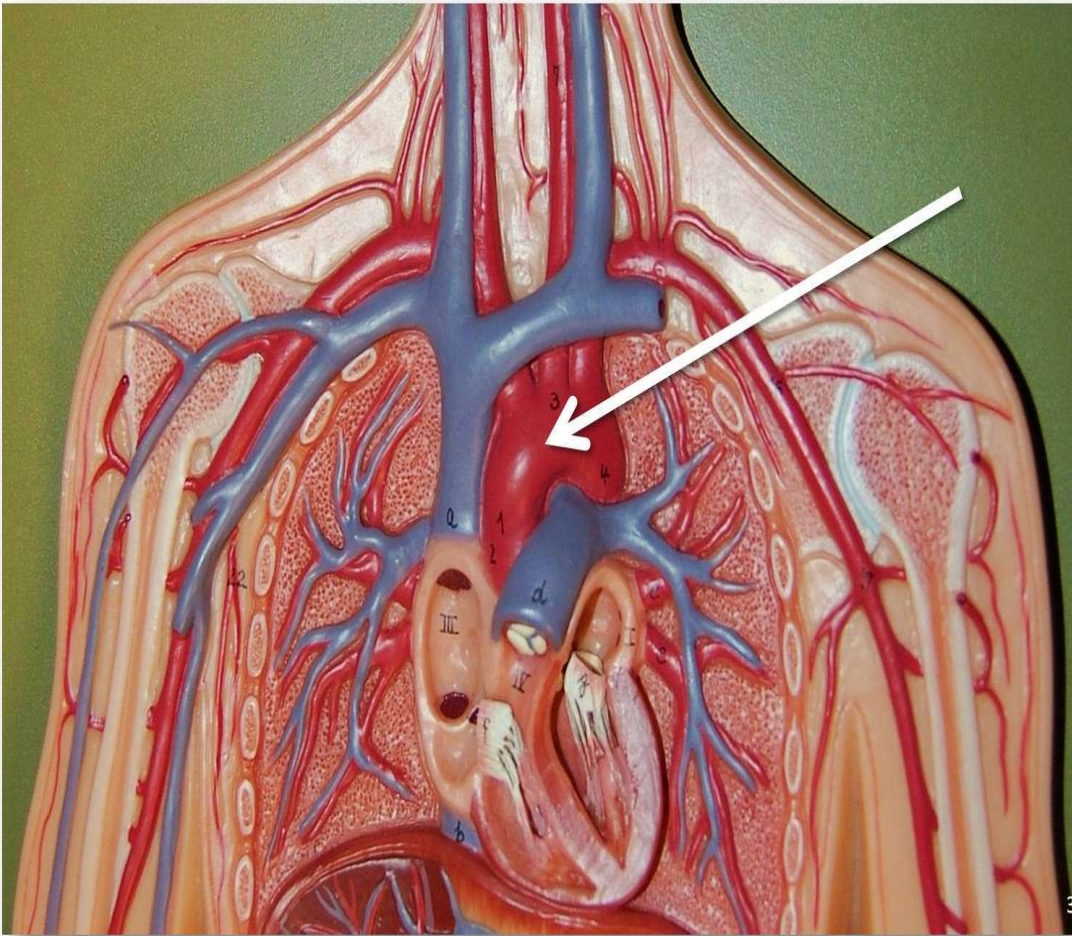
Right Common Carotid Artery



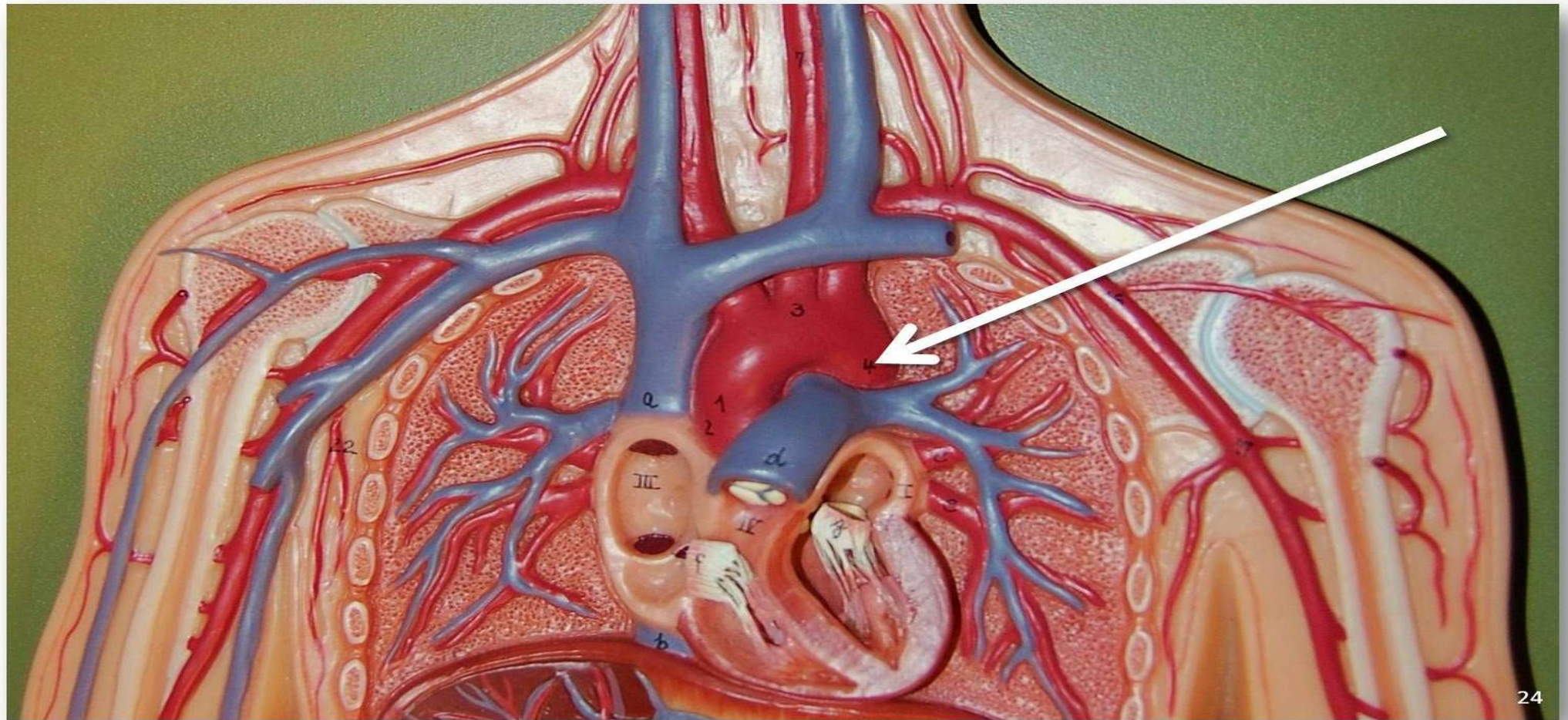
Brachiocephalic Trunk (Innominate Artery)

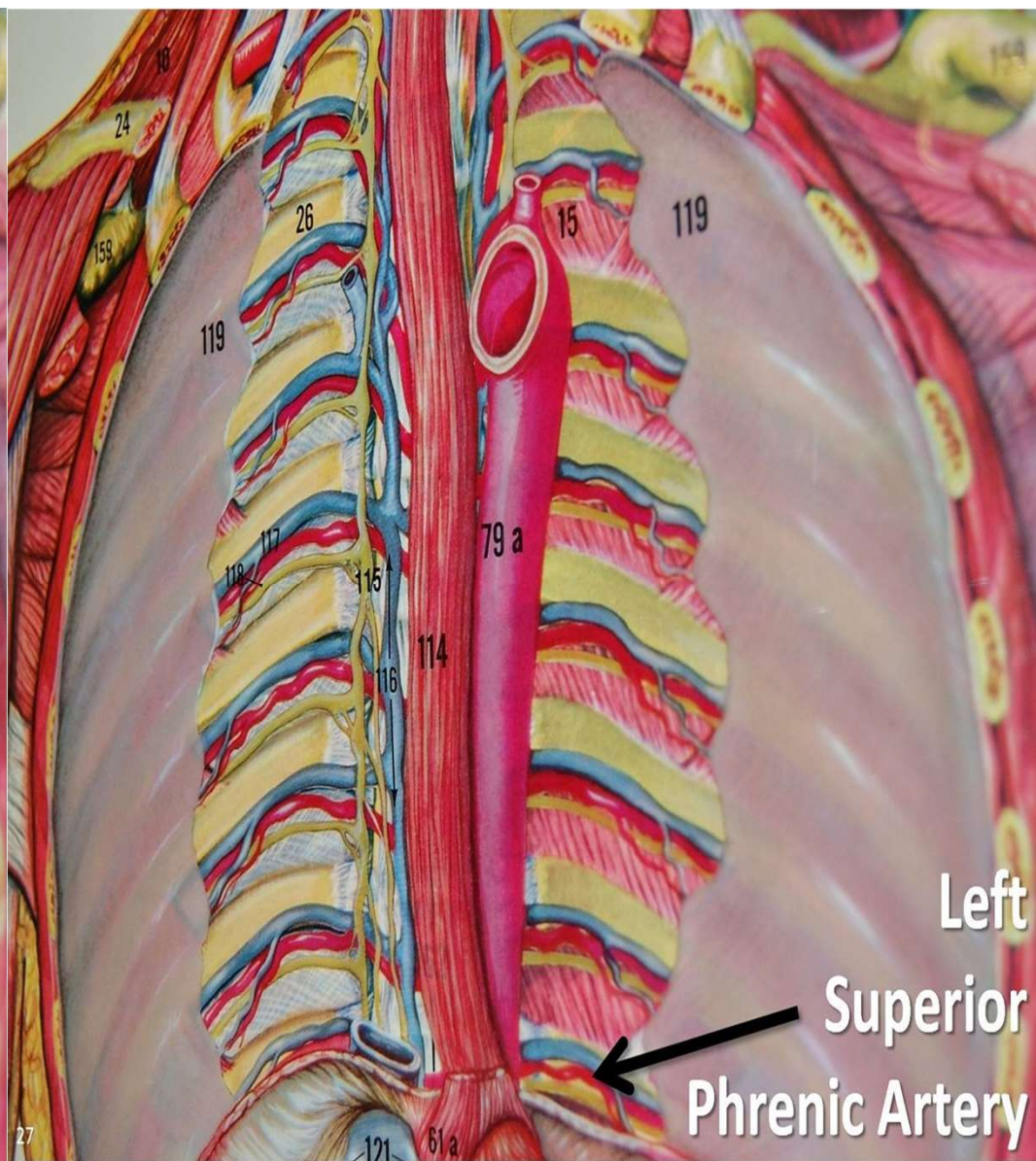
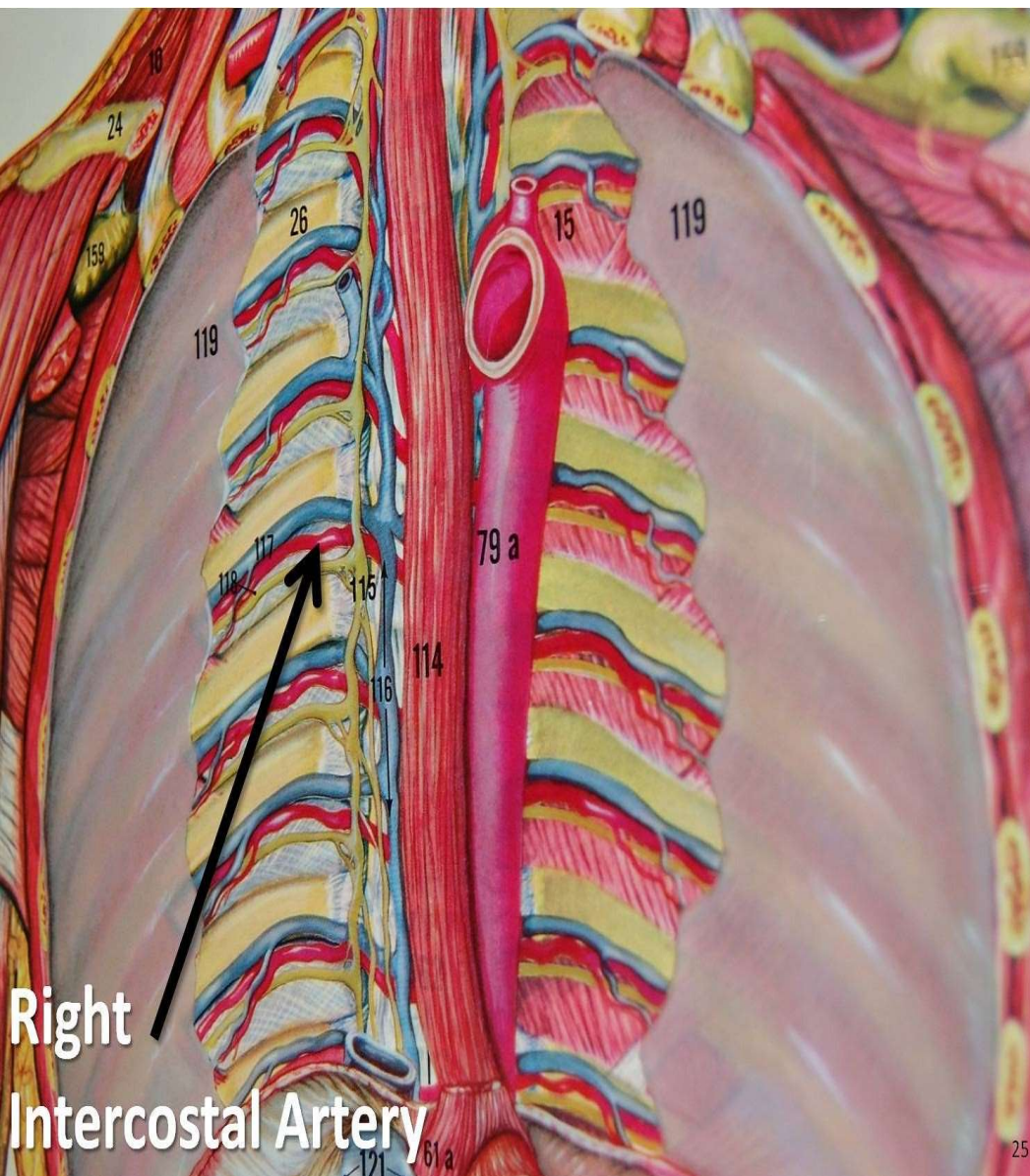


Arch of the Aorta

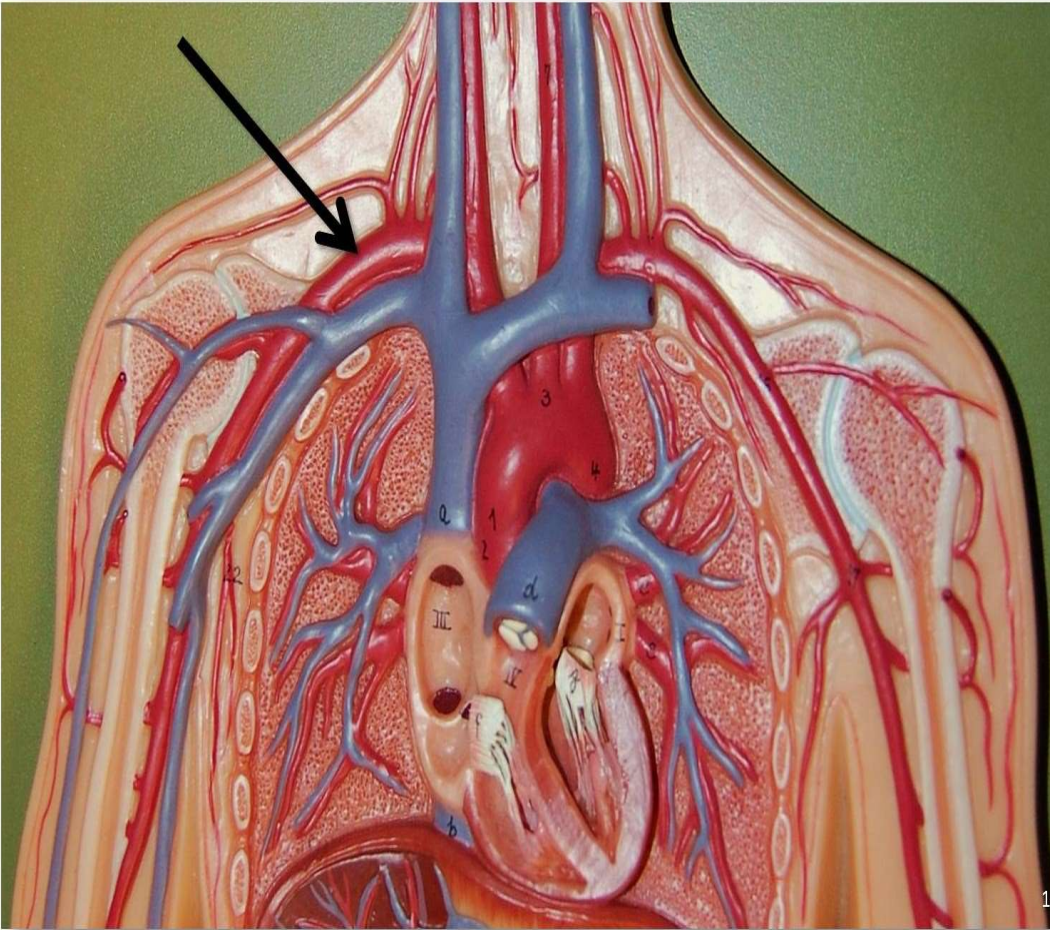


Descending (Thoracic) Aorta

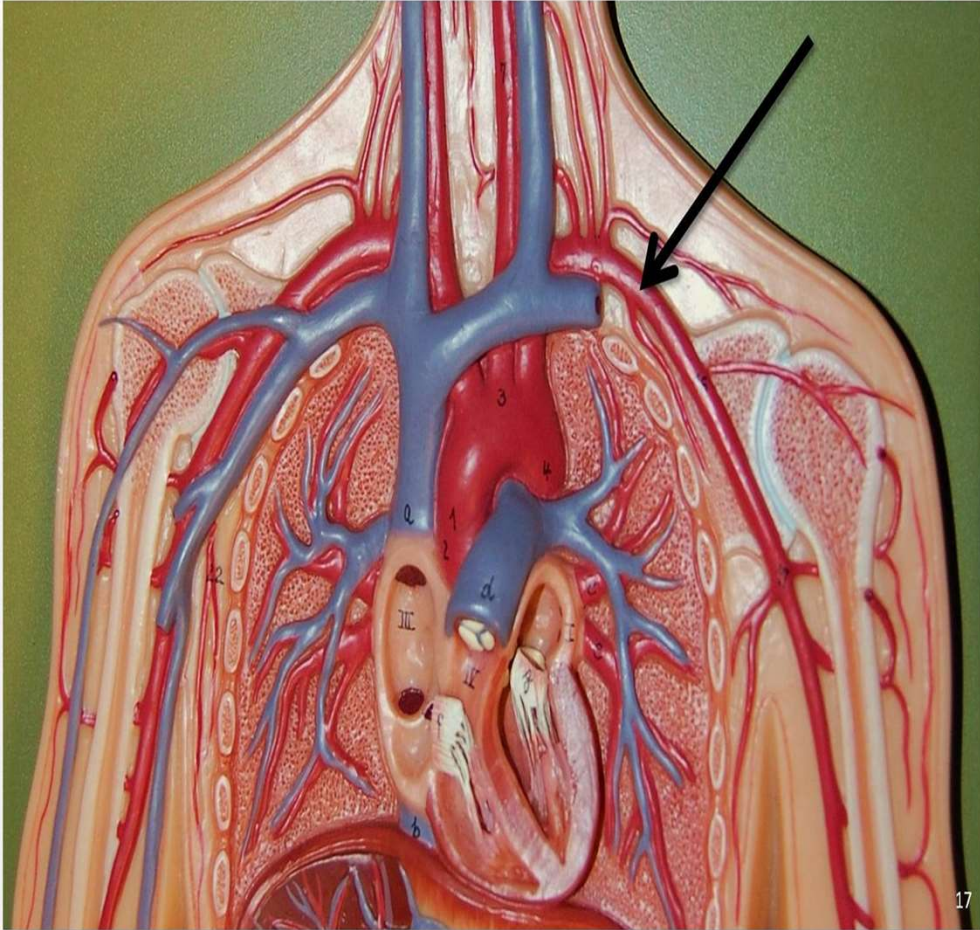




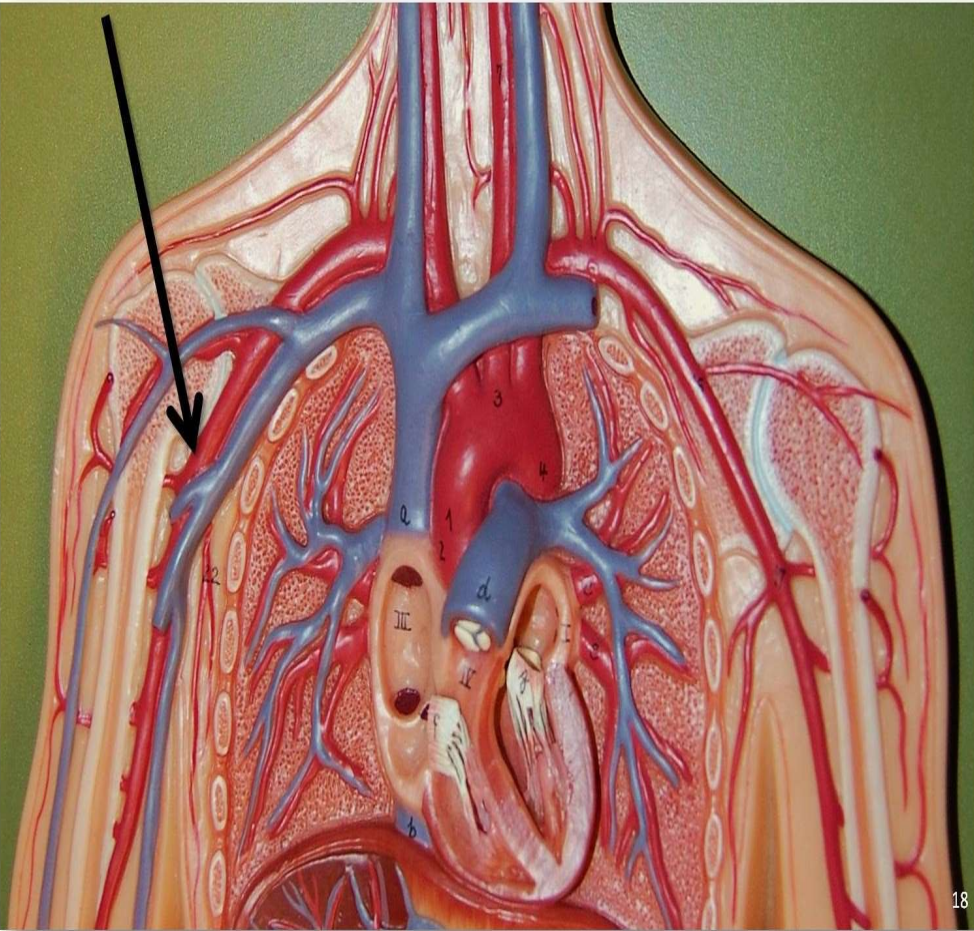
Right Subclavian Artery



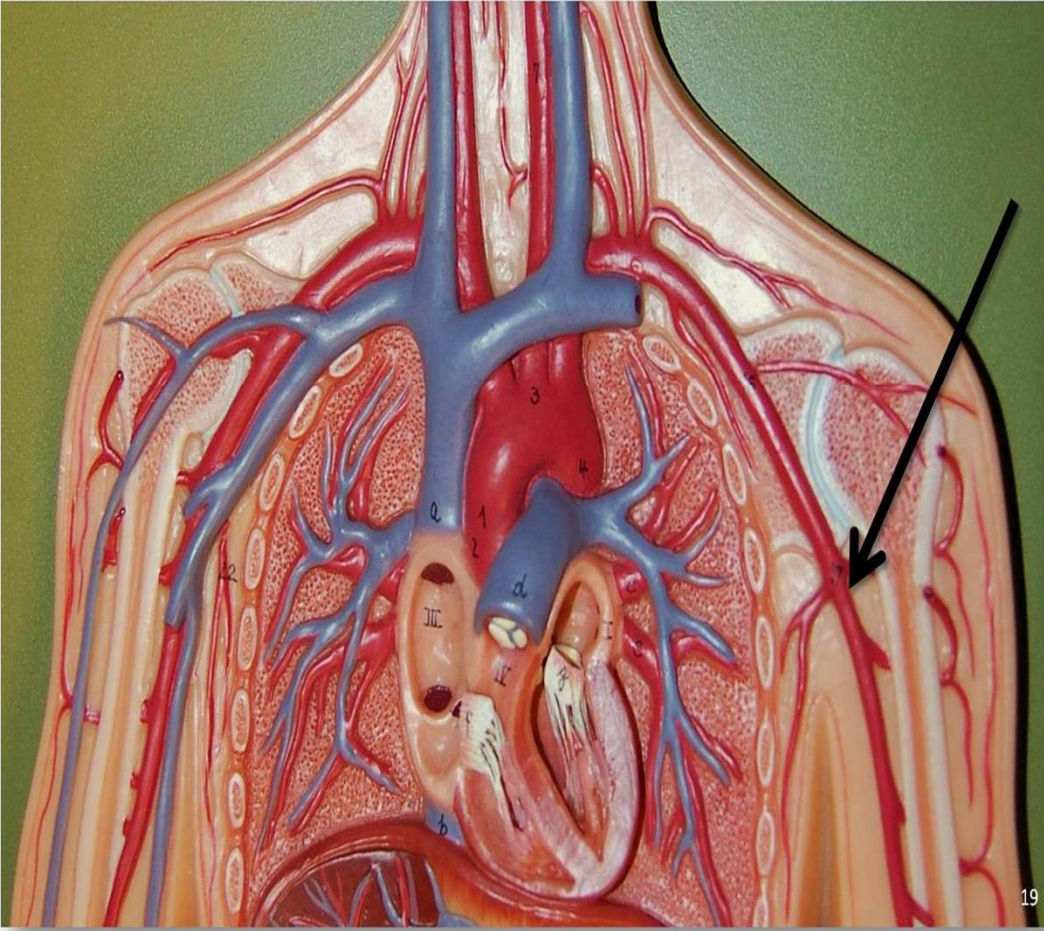
Left Subclavian Artery

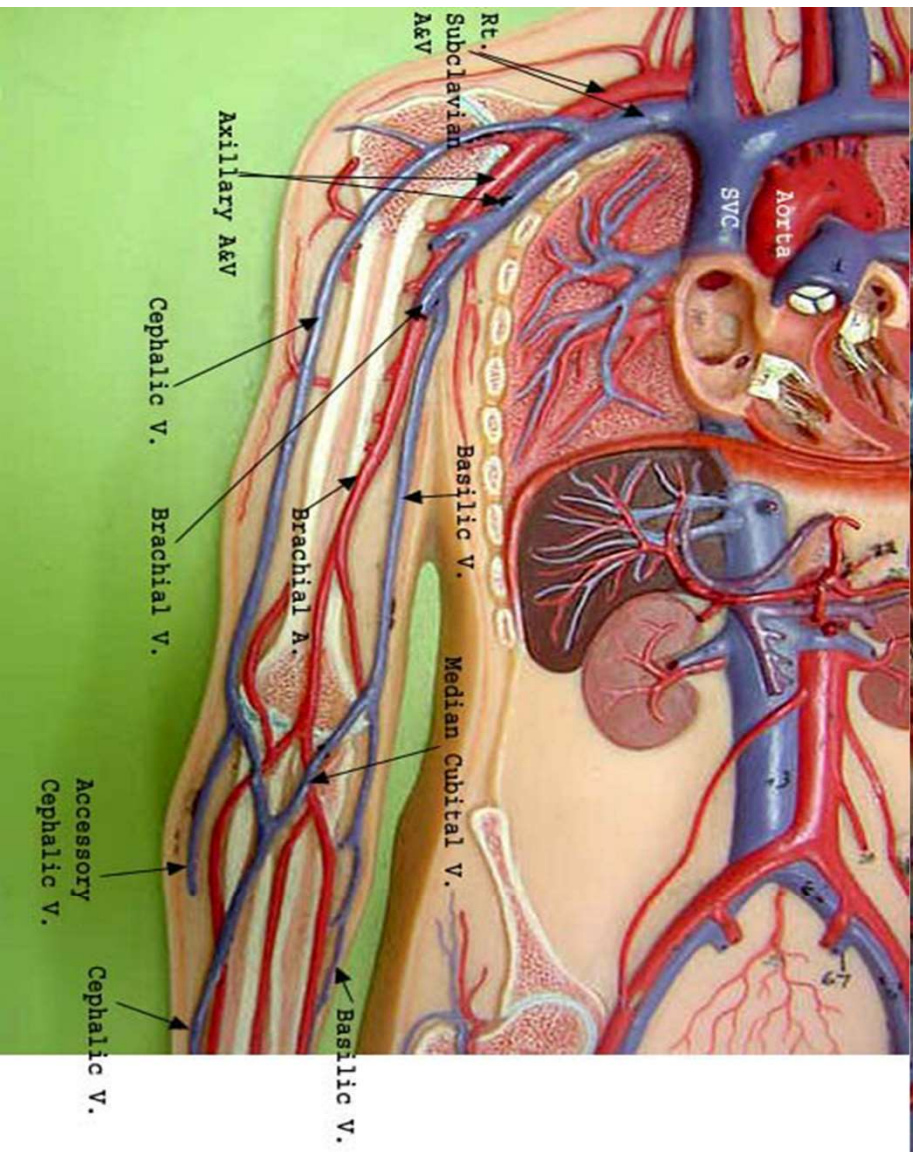
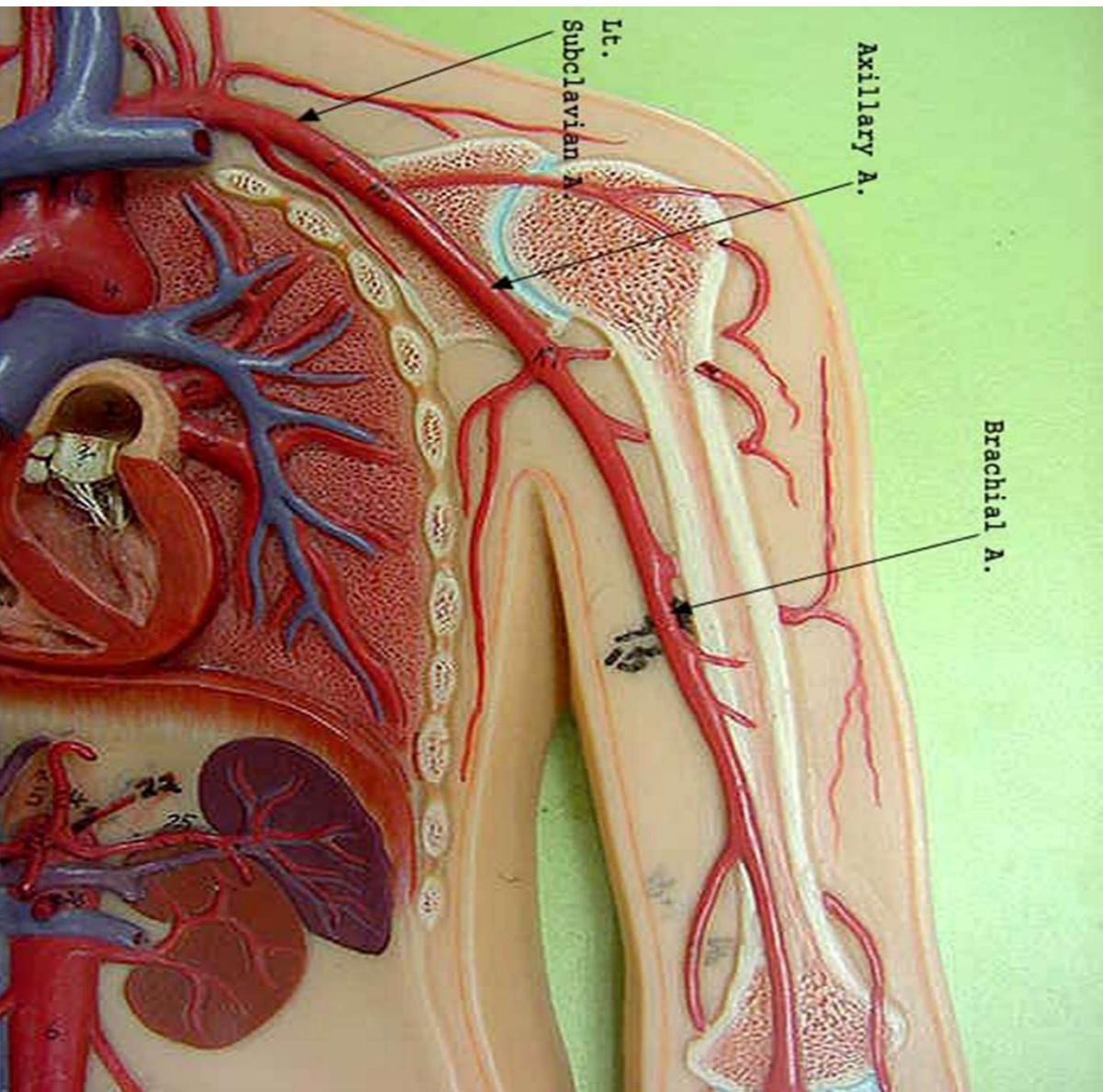


Right Axillary Artery



Left Axillary Artery





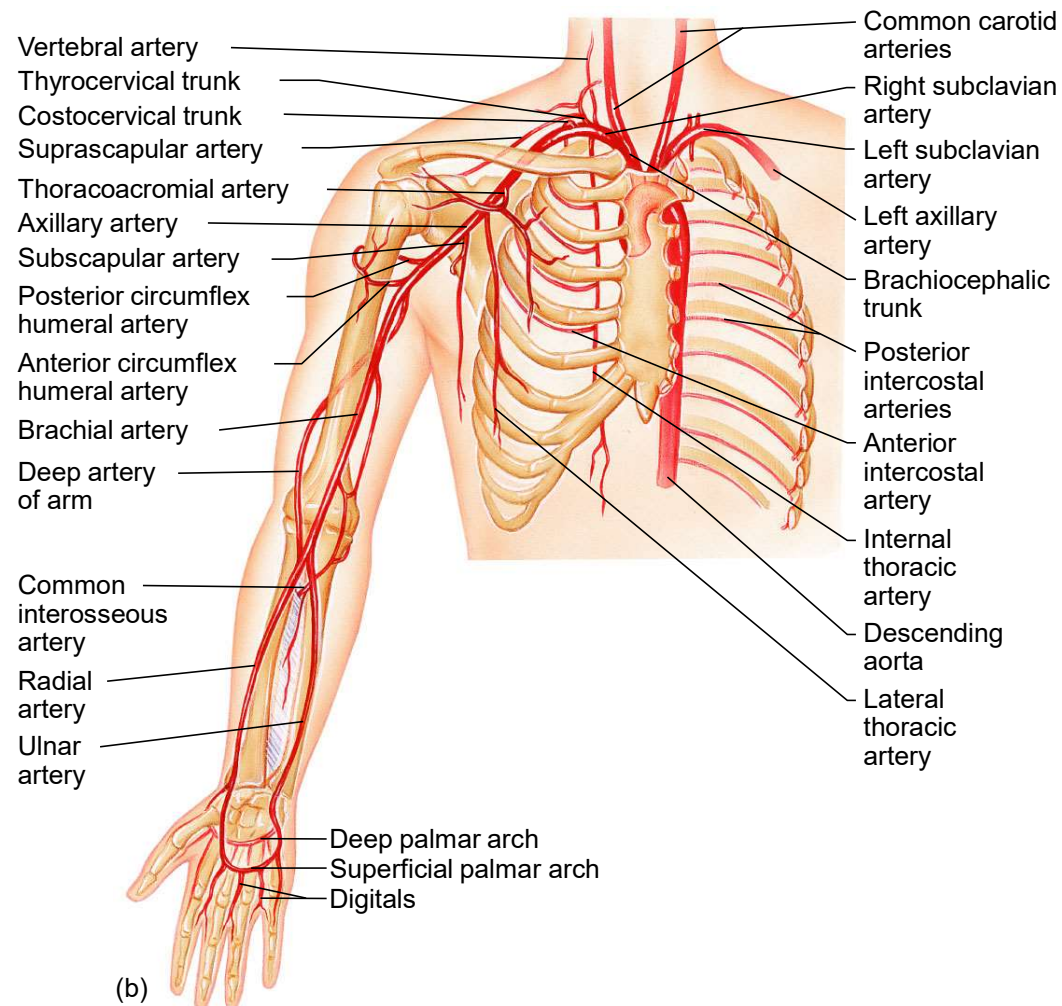
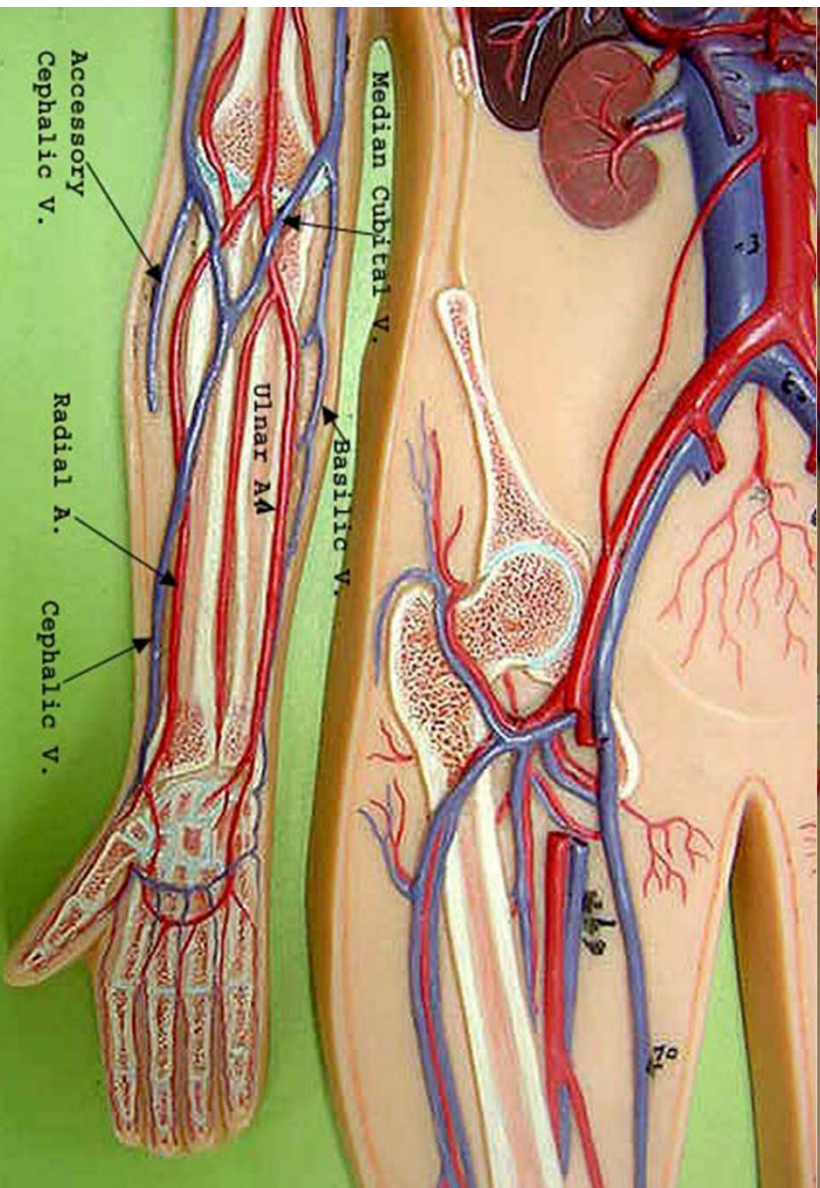
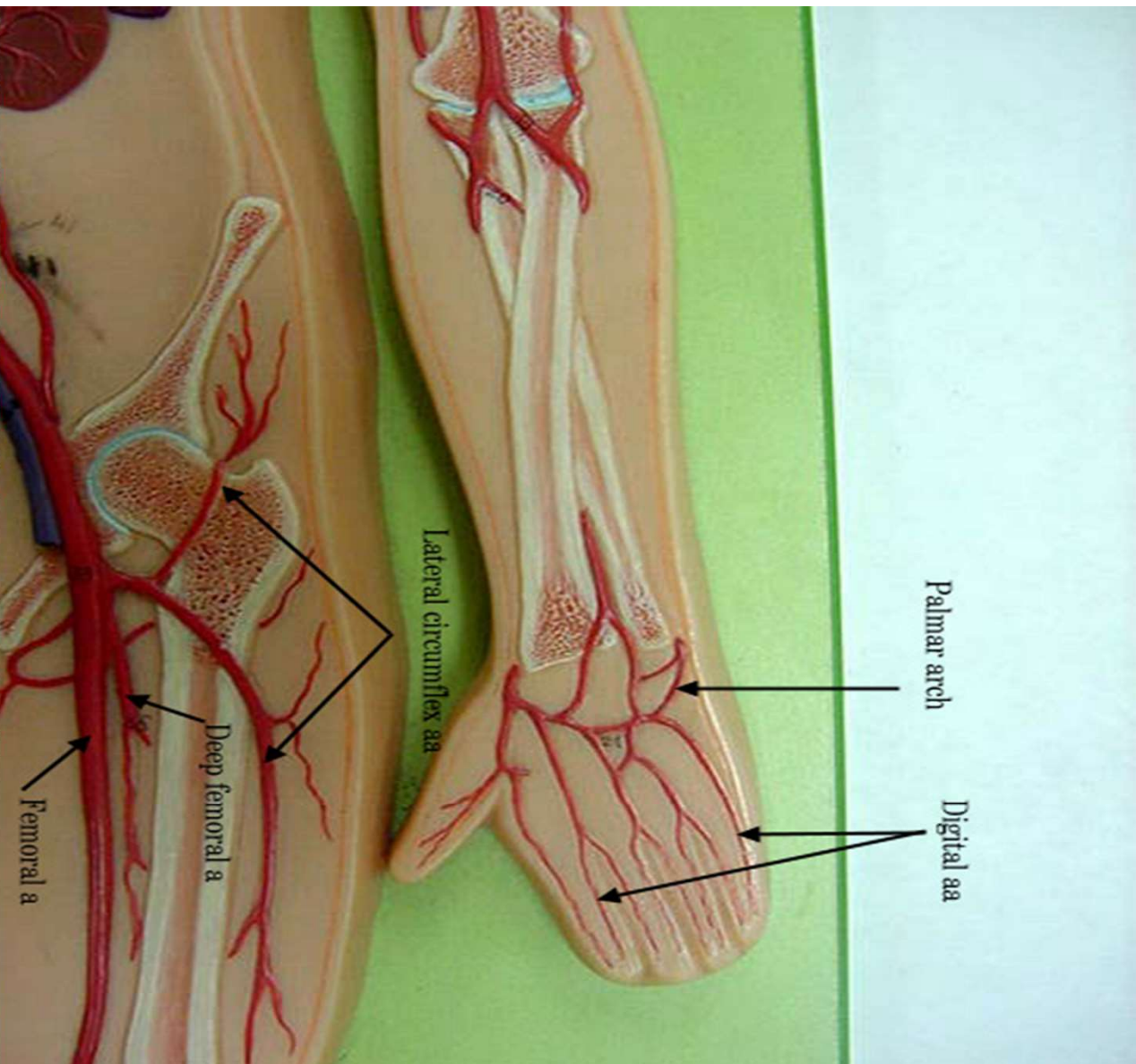
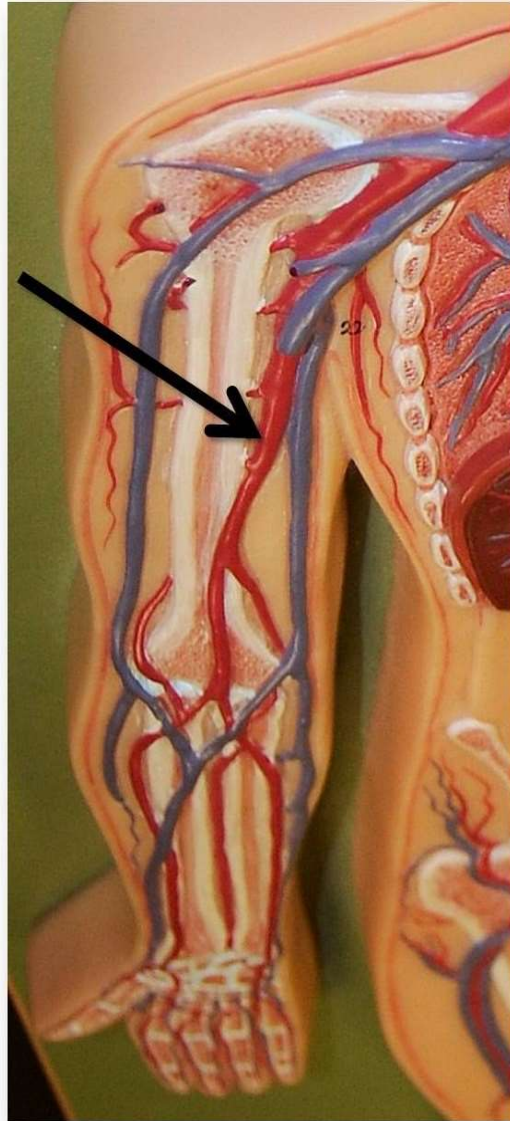


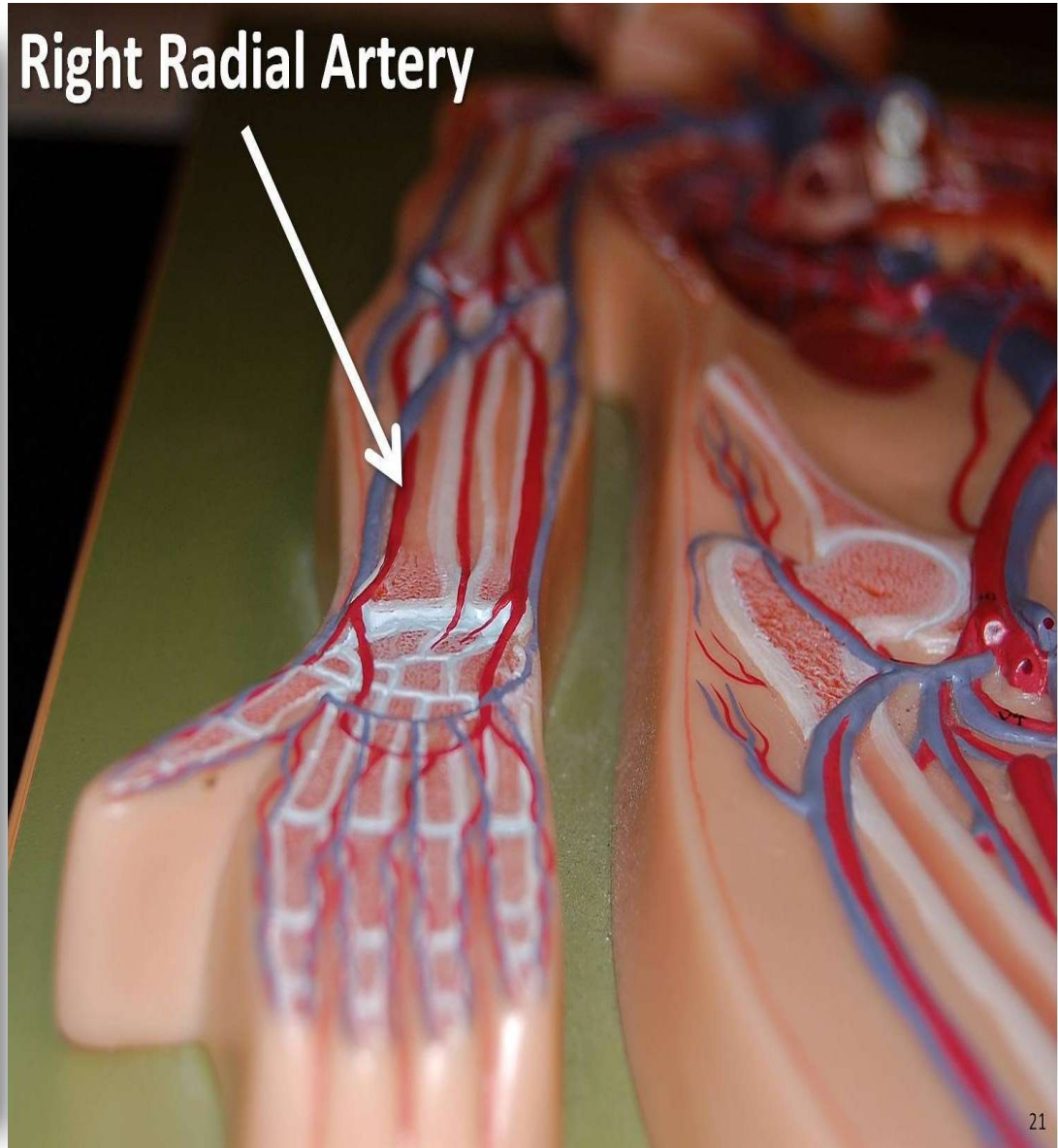
Figure 19.22b



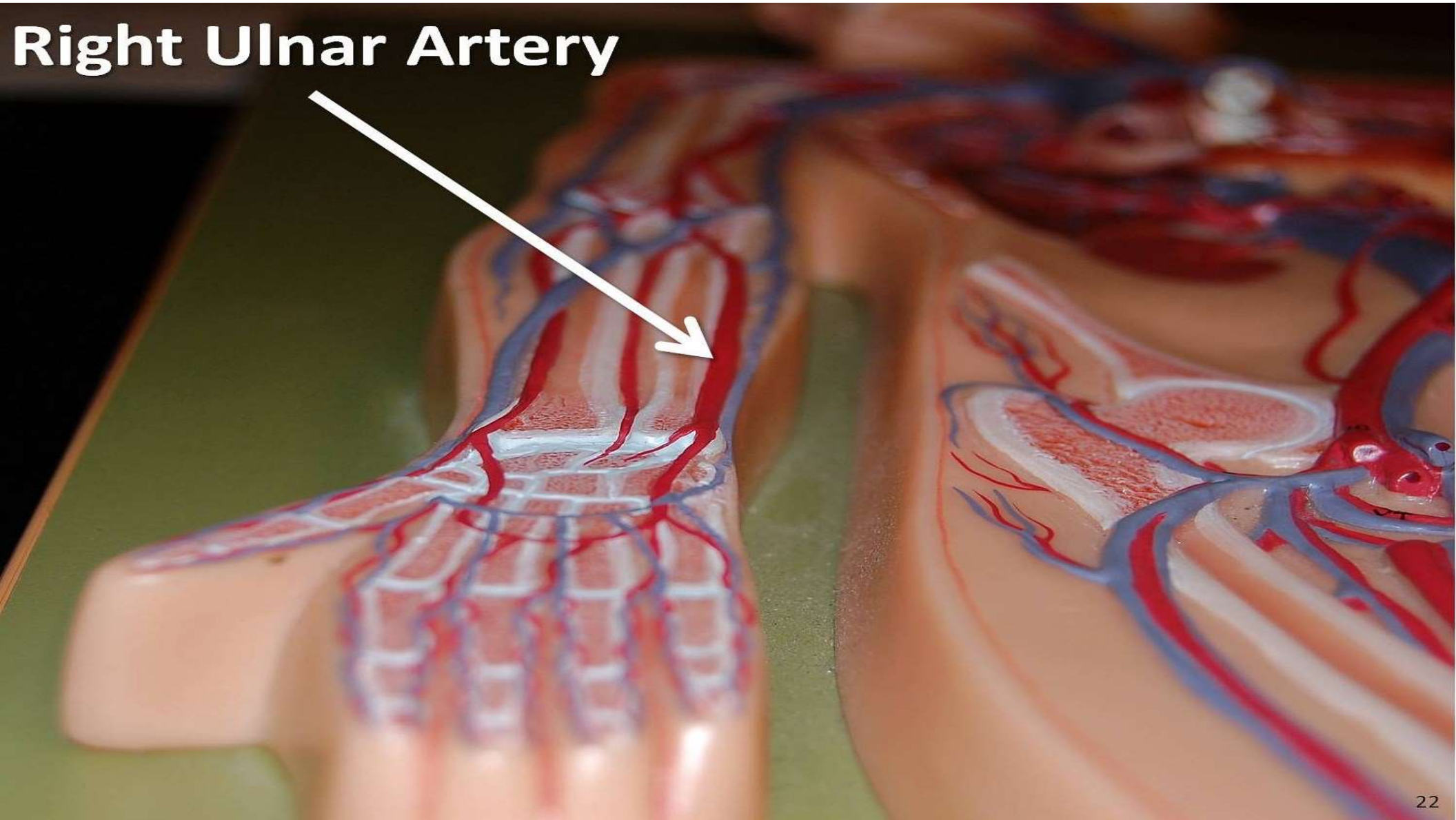
**Right Brachial
Artery**



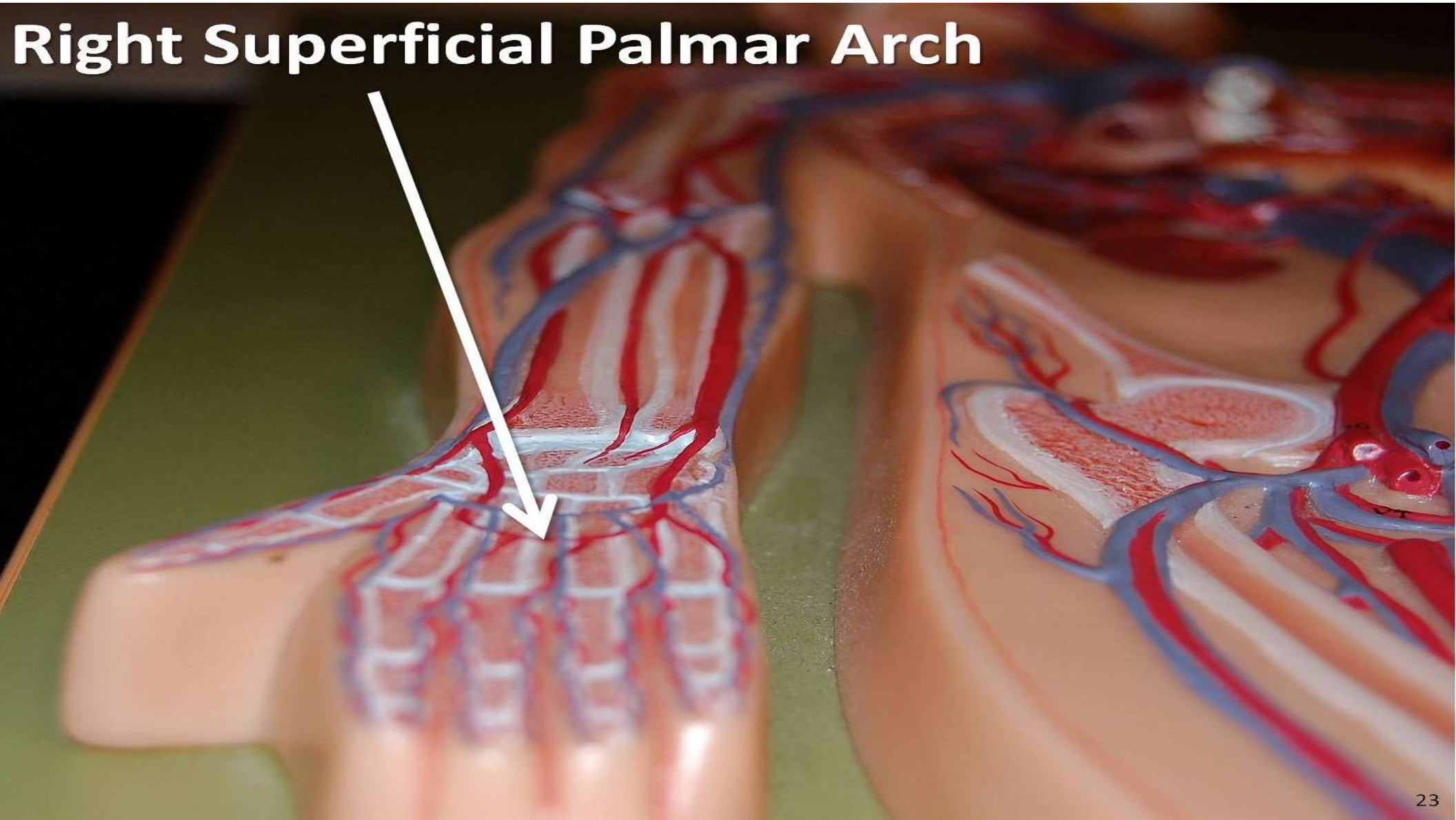
Right Radial Artery



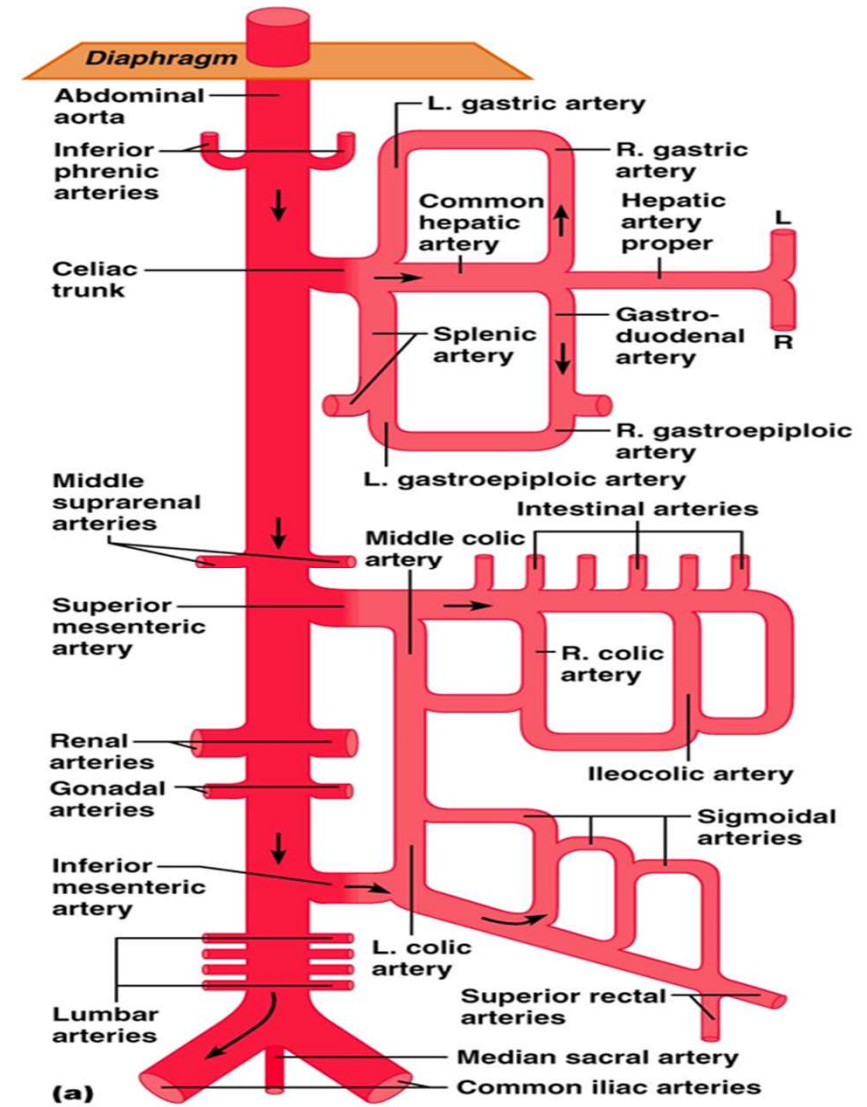
Right Ulnar Artery

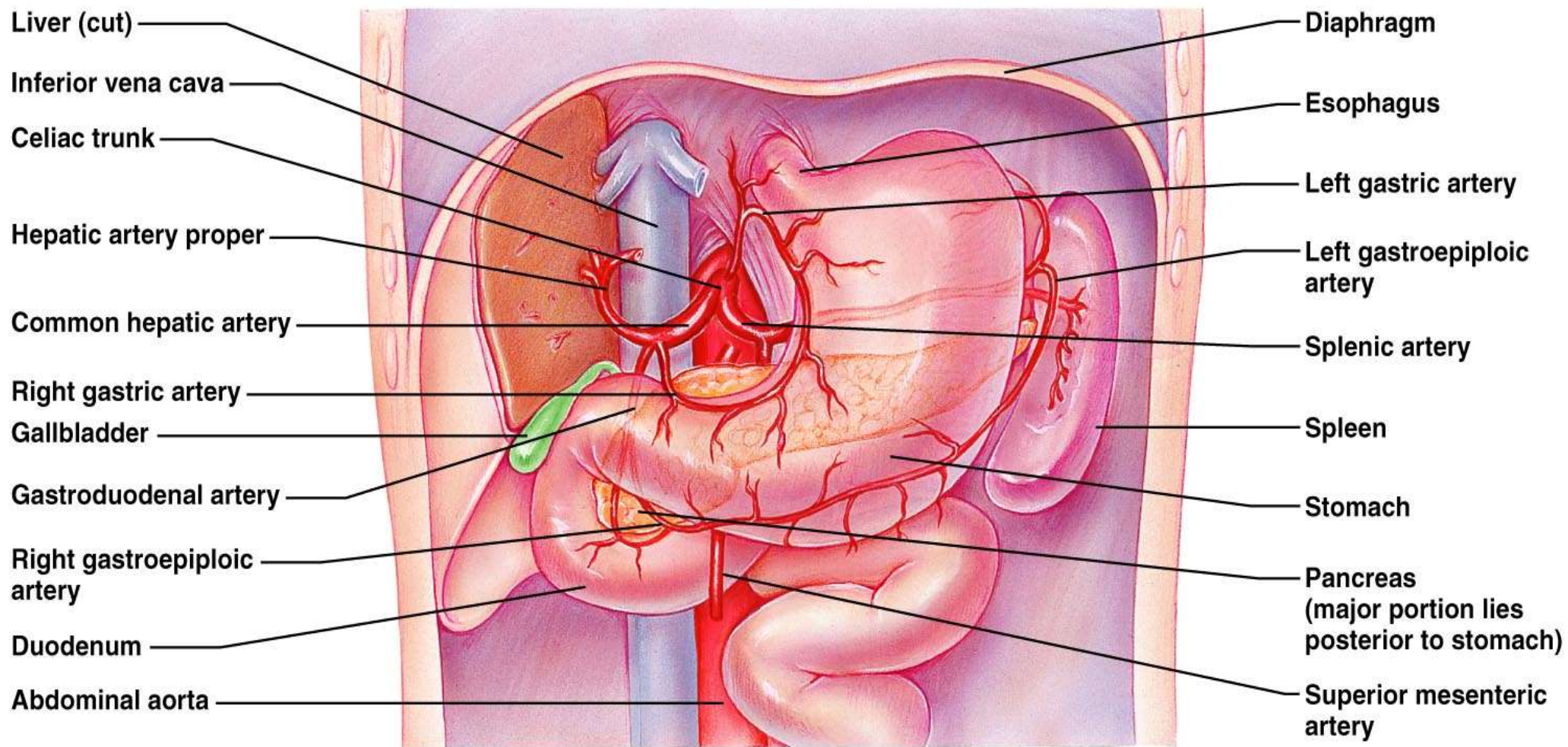


Right Superficial Palmar Arch

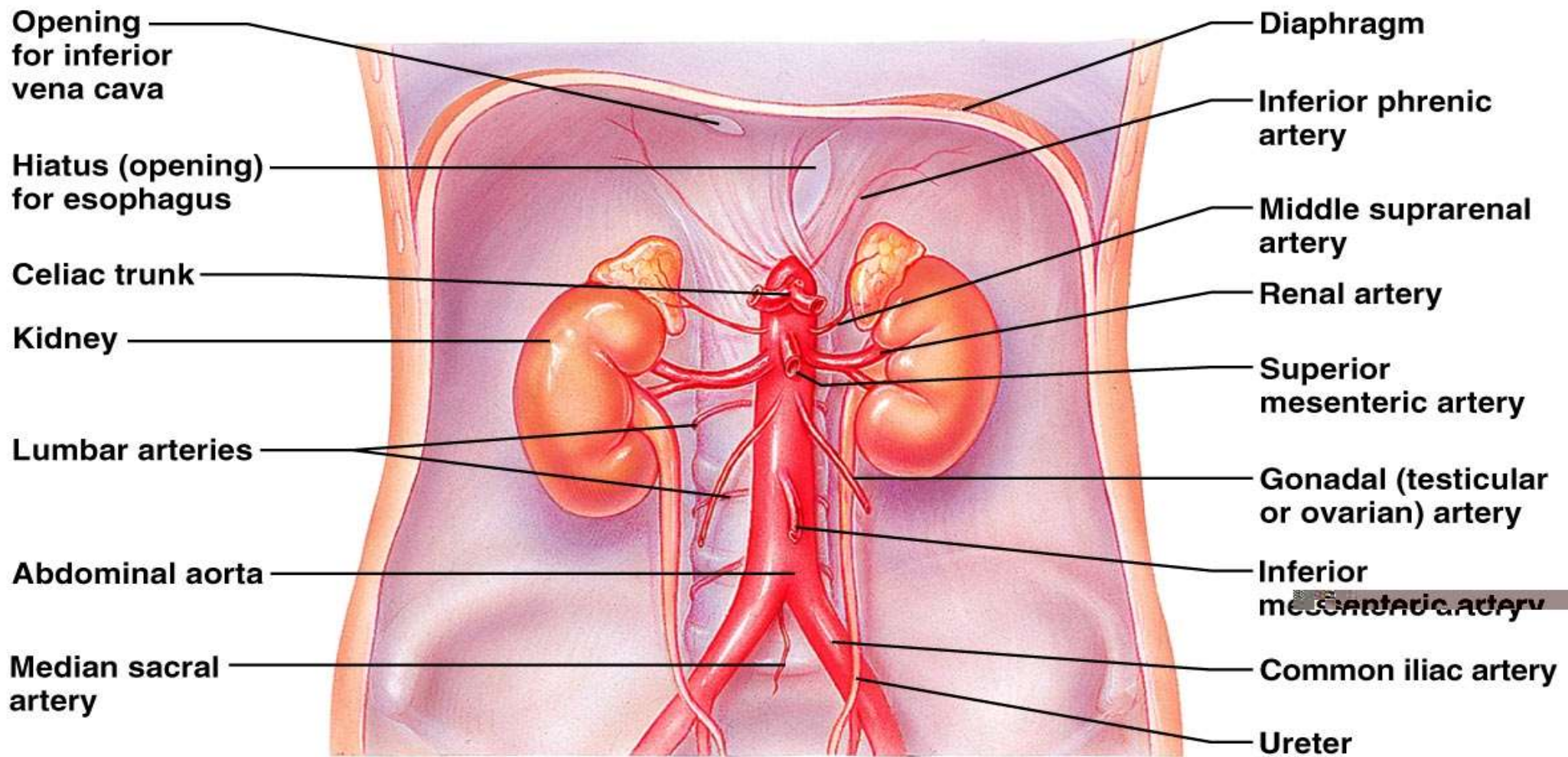


Abdominal vascularization

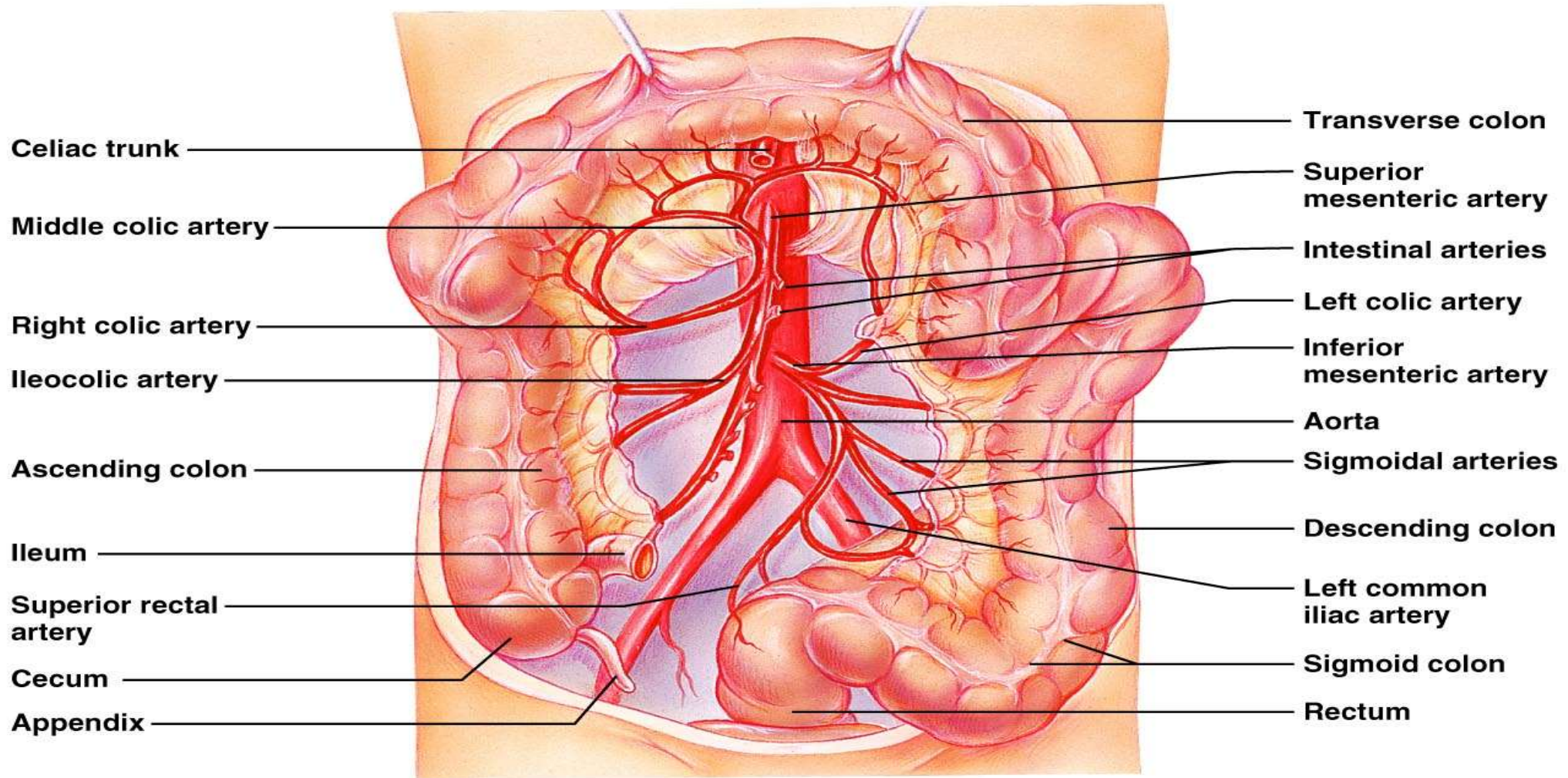




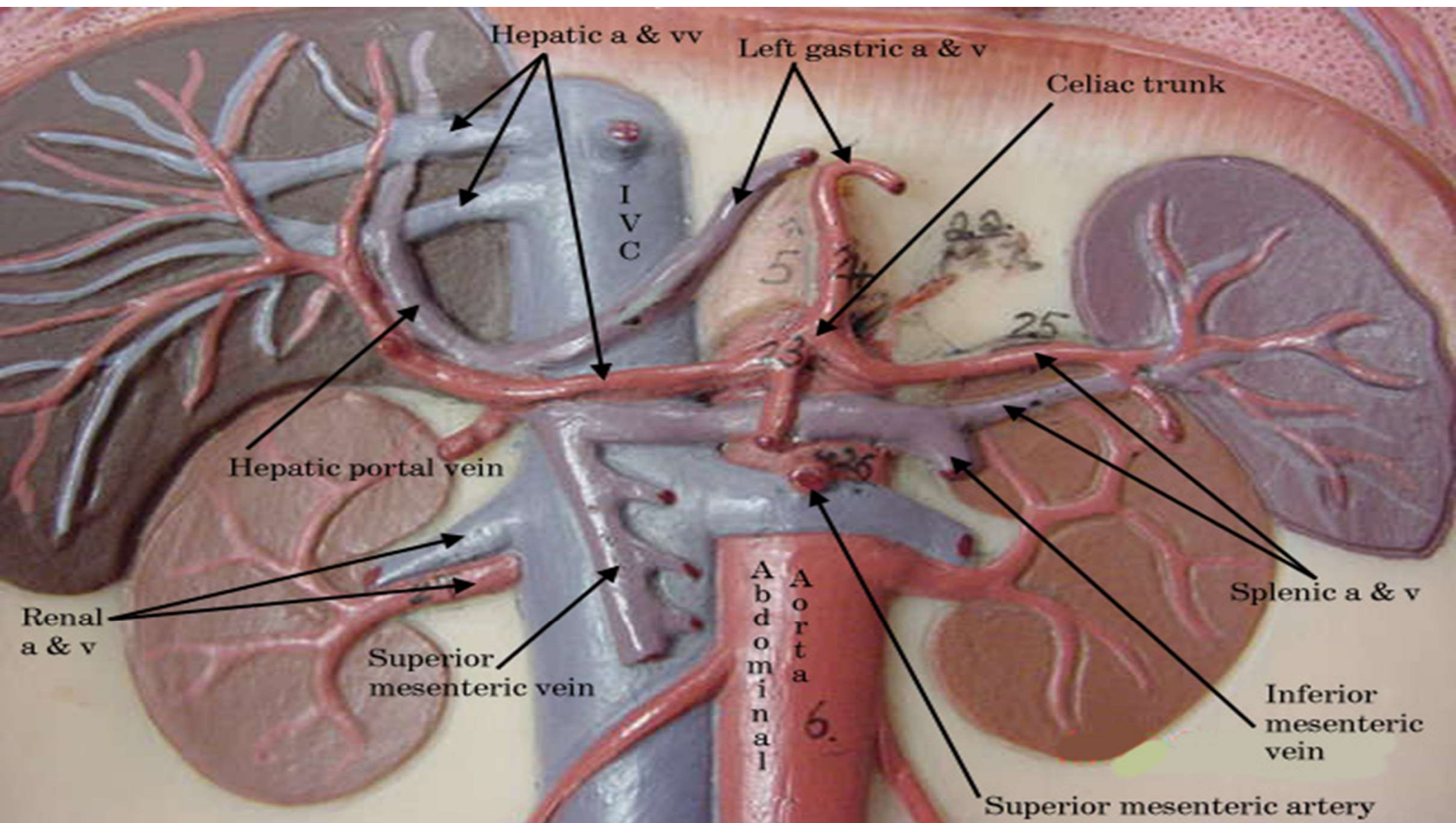
(b)

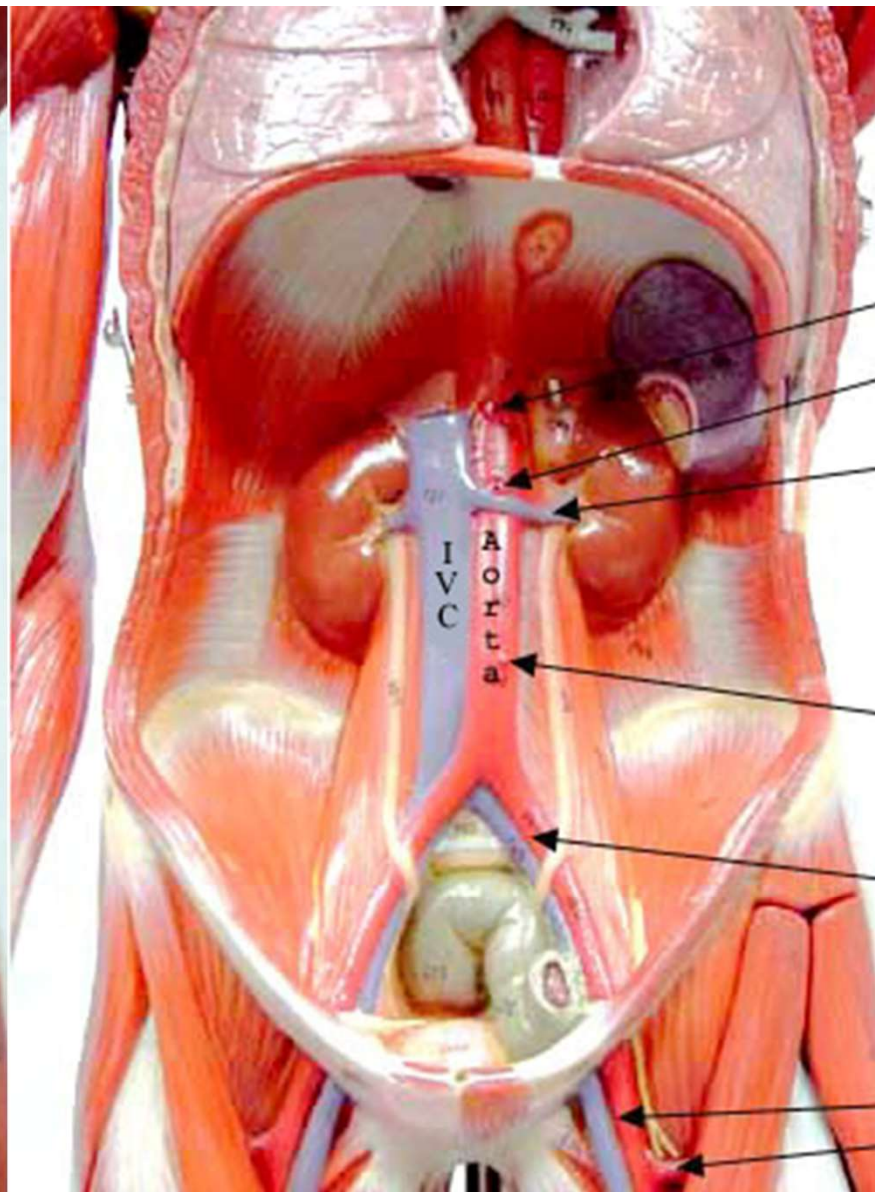
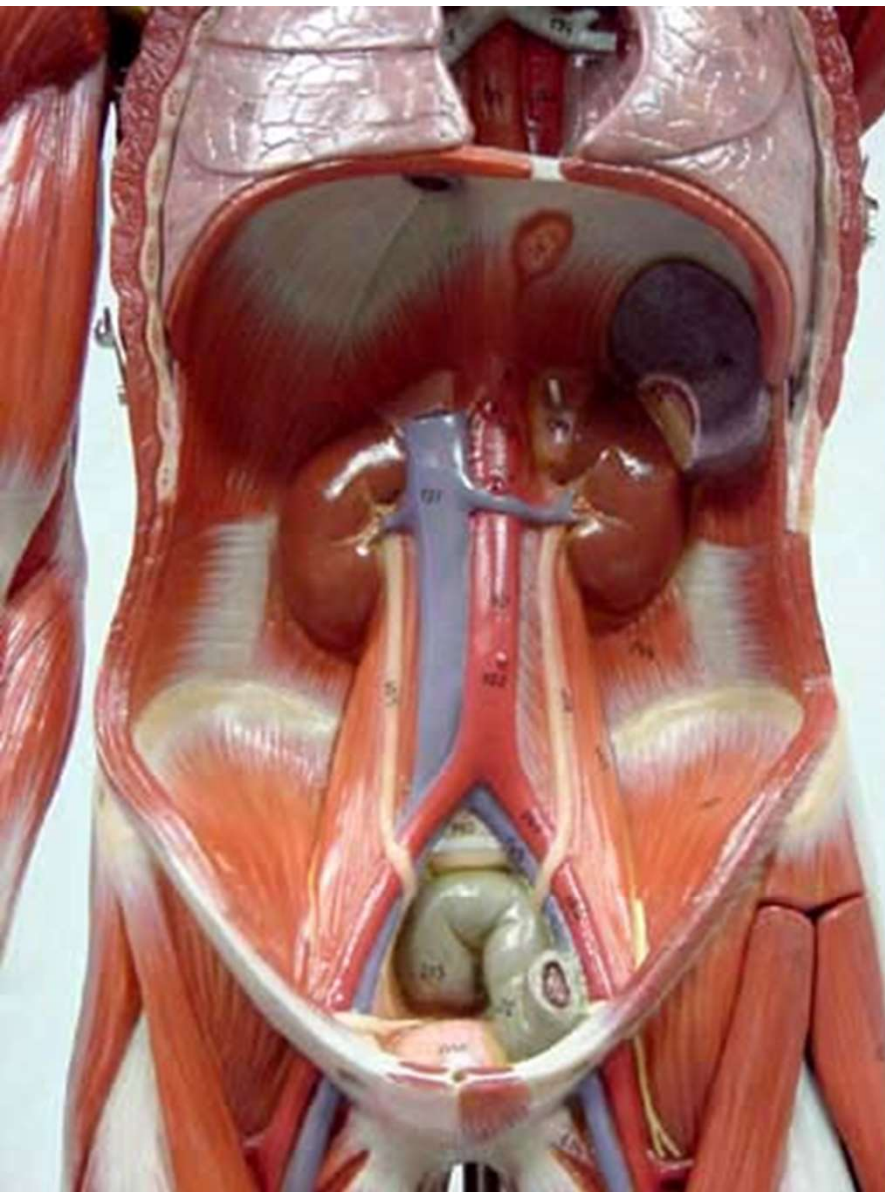


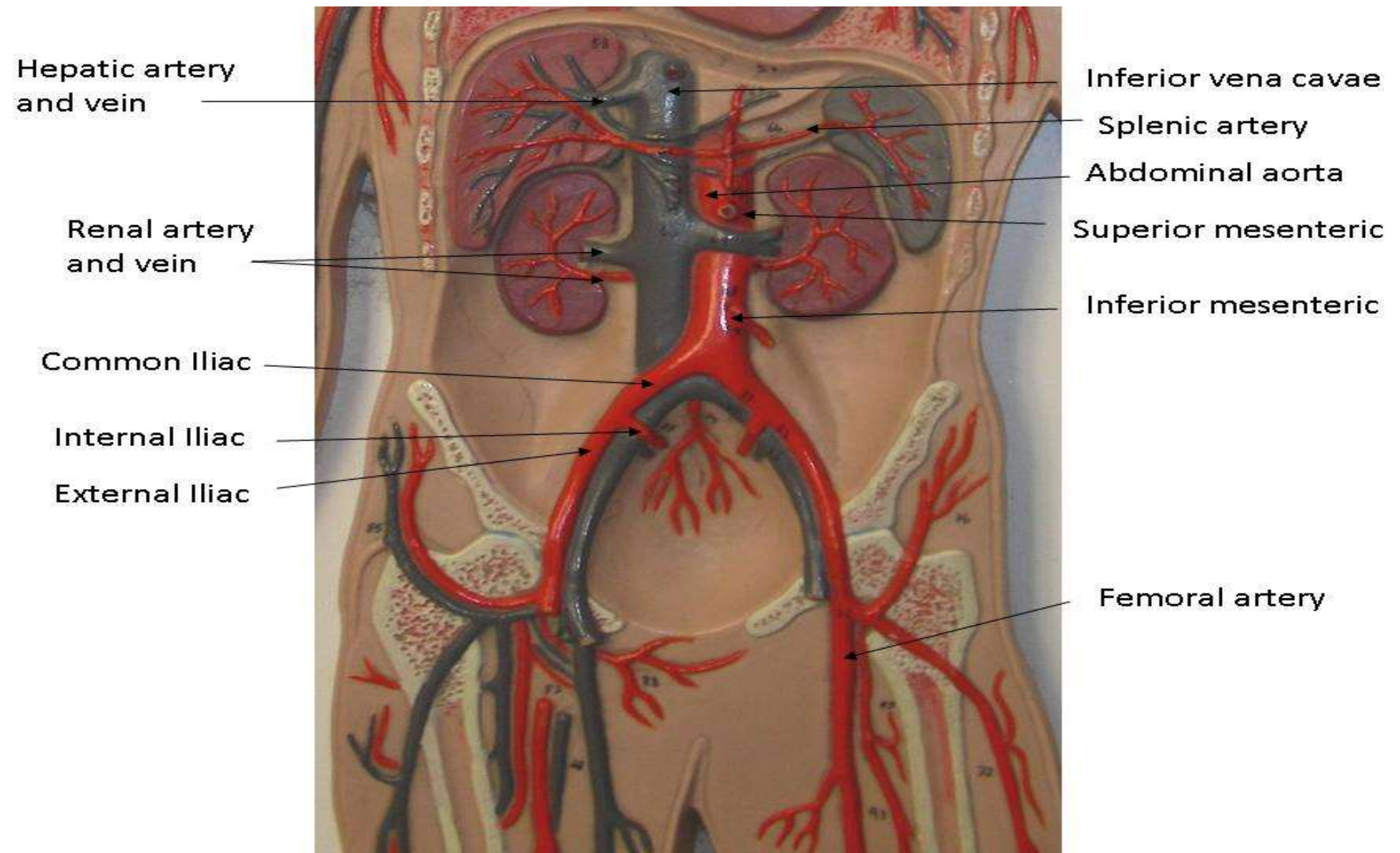
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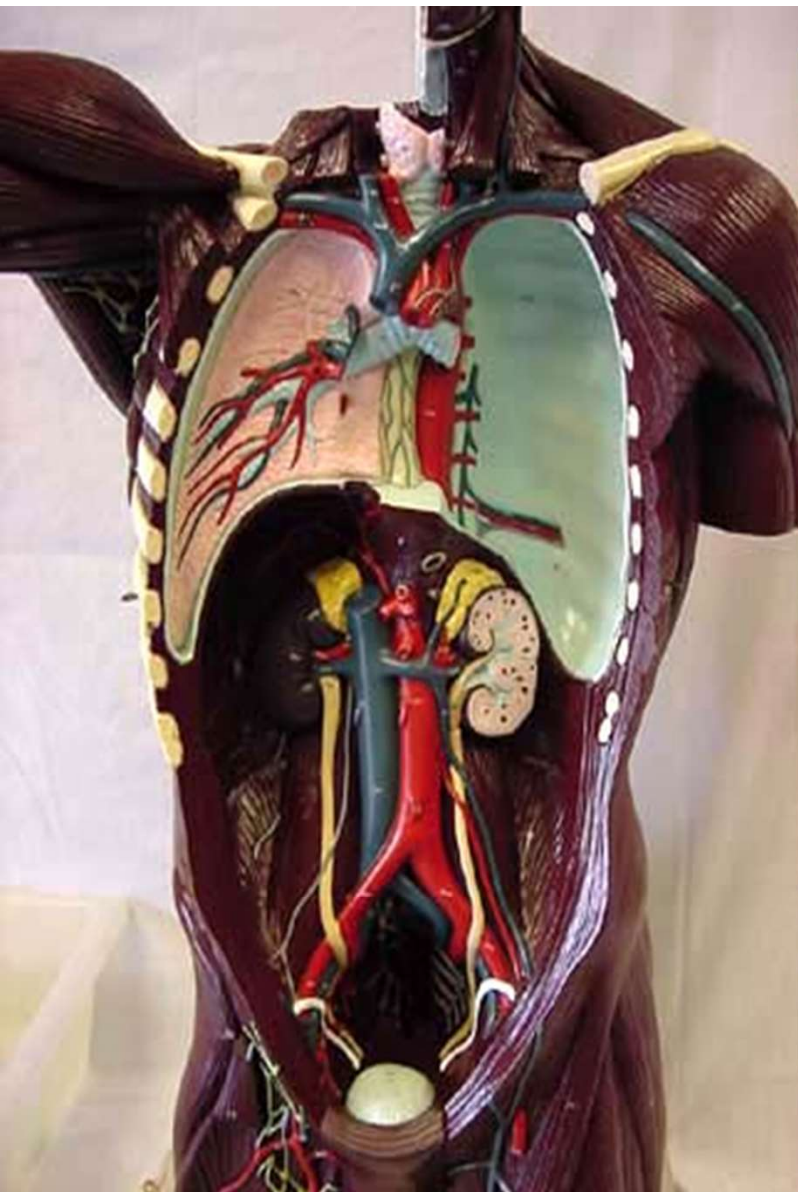


(d)



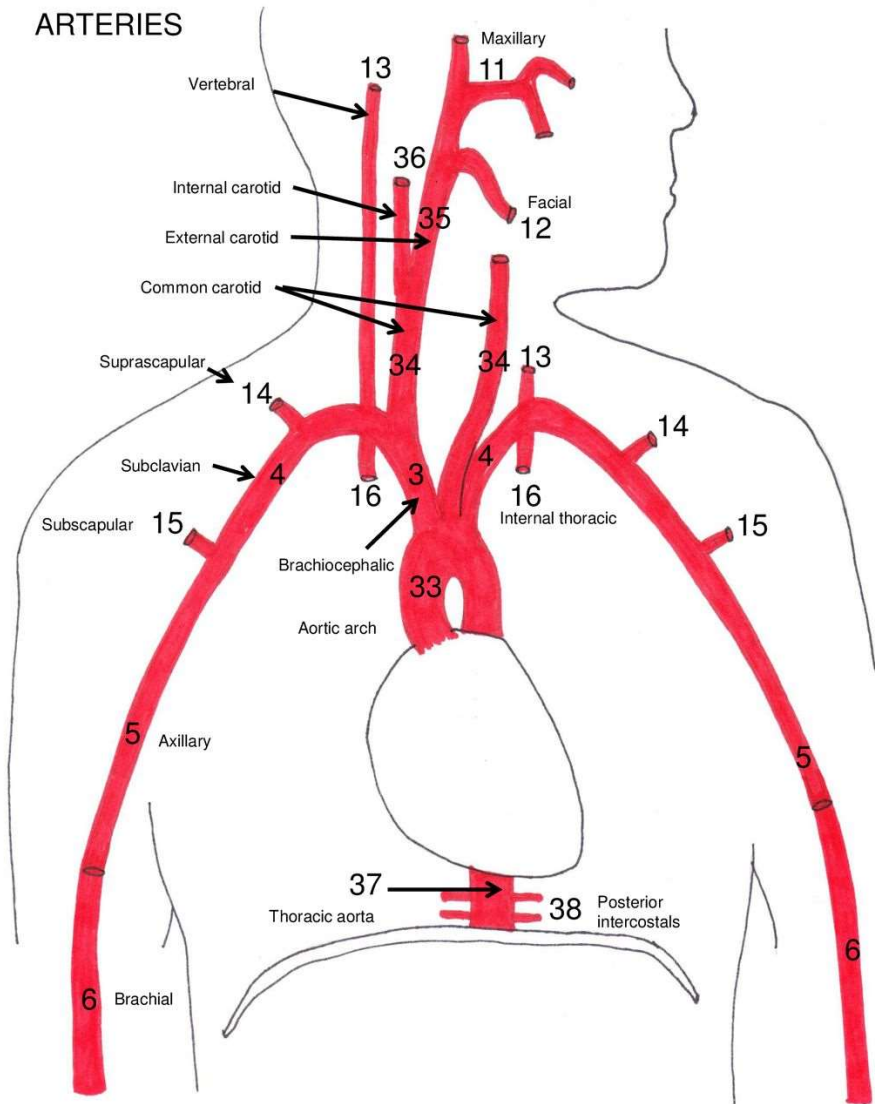




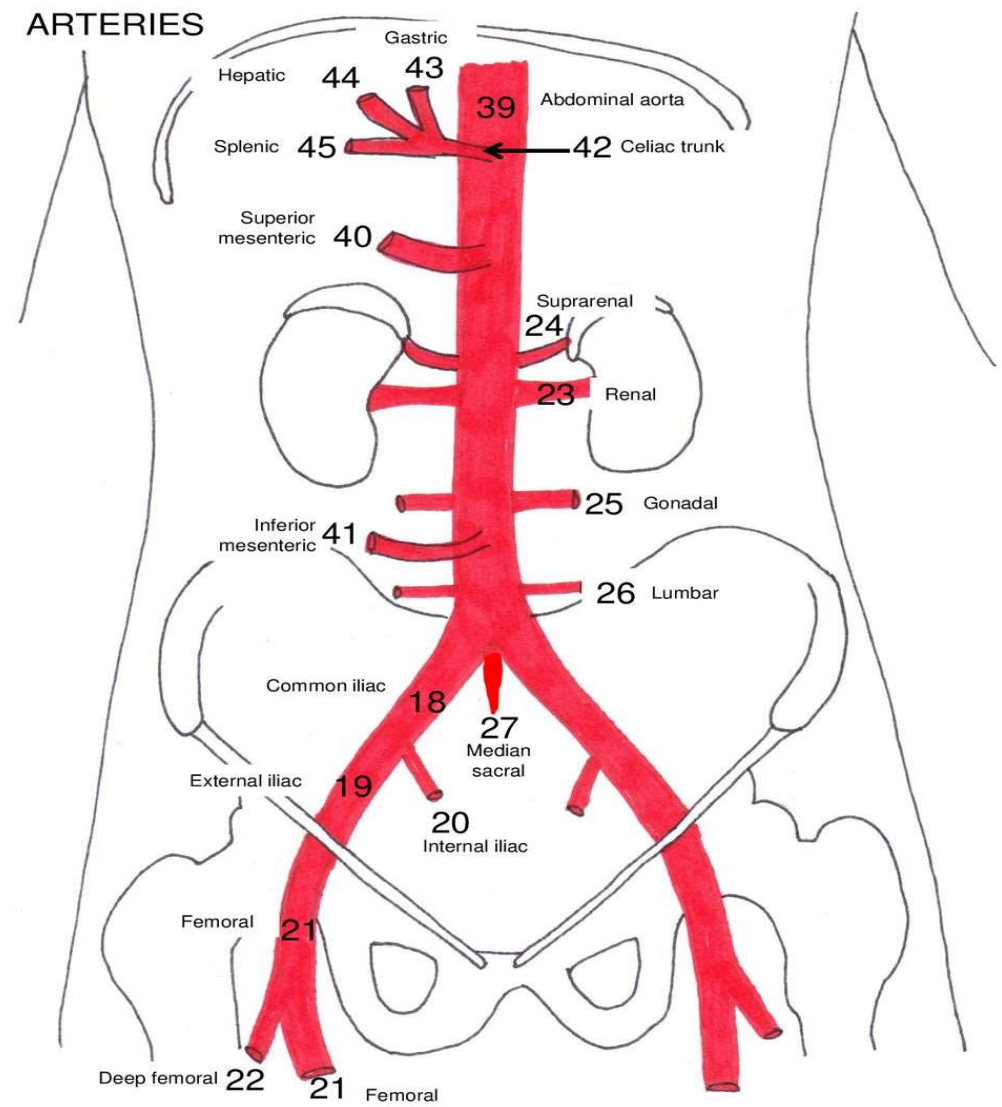


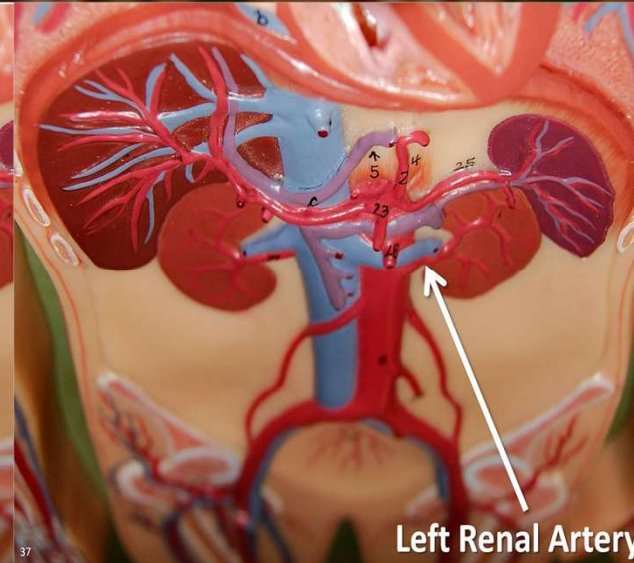
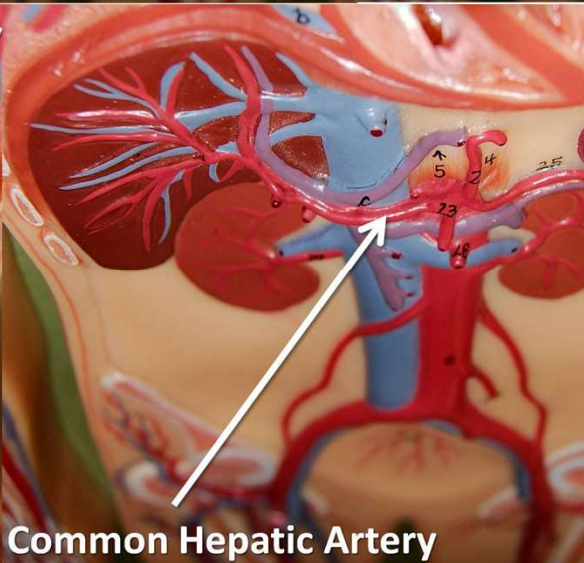
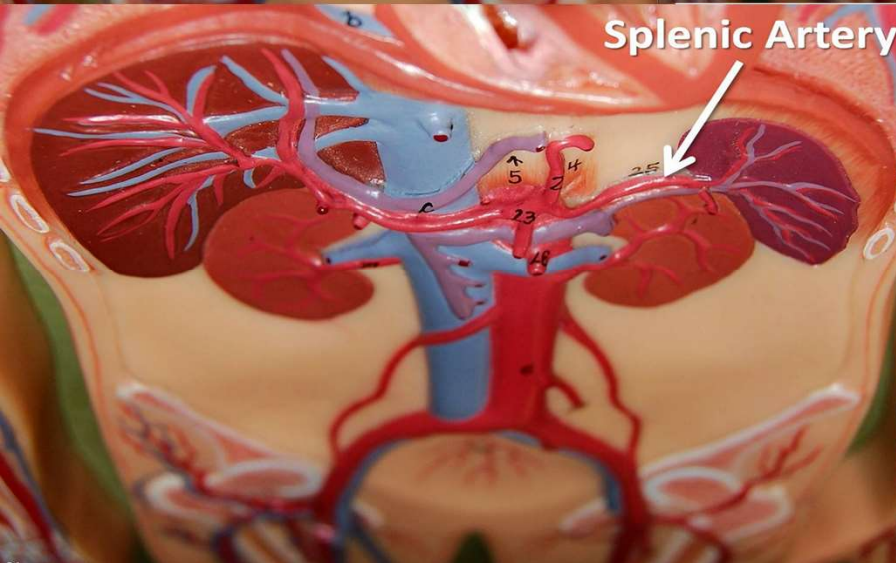
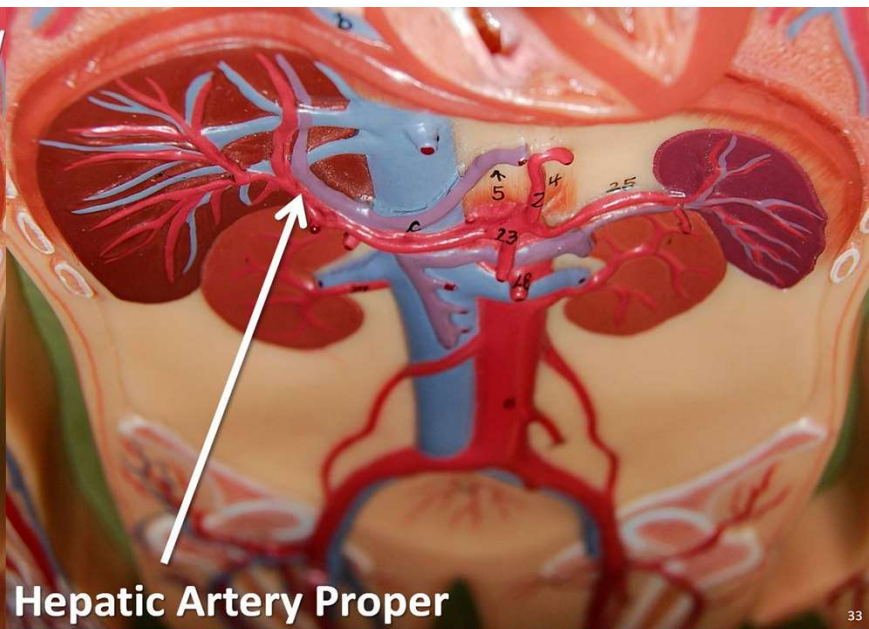
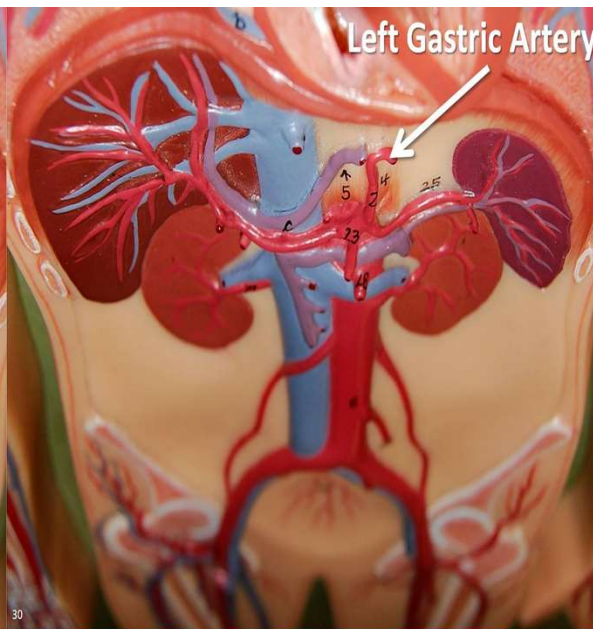
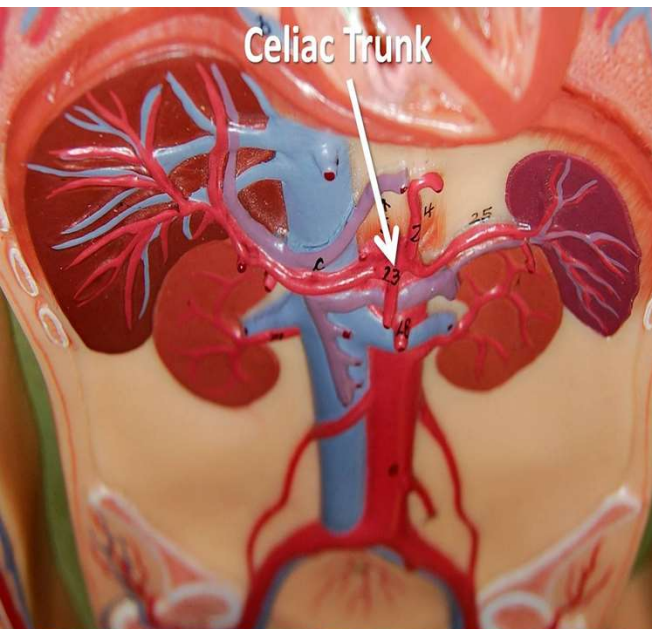
1. SVC
2. Brachiocephalic Vv.
3. Subclavian V.
4. Cephalic V.
5. Internal Jugular Vv.
6. External Jugular V.
7. Hemiazygos V.
8. Intercostal A.&V.
9. IVC
10. Suprarenal (Adrenal) V.
11. Renal A&V.
12. Gonadal A&V.
13. Common Iliac A&V.
14. Internal Iliac A&V.
15. External Iliac A&V.
16. Aortic Arch
17. Thoracic Aorta
18. Abdominal Aorta

ARTERIES



ARTERIES





Arteries of the Abdomen

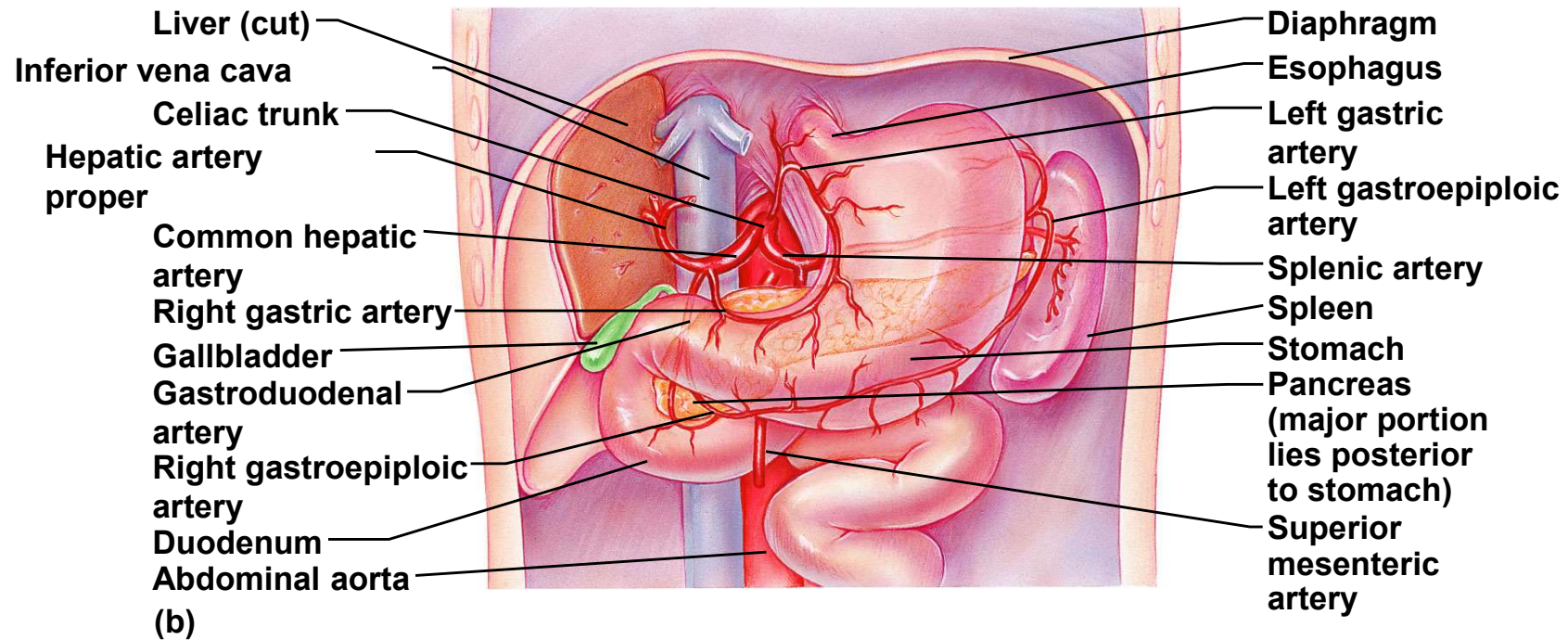
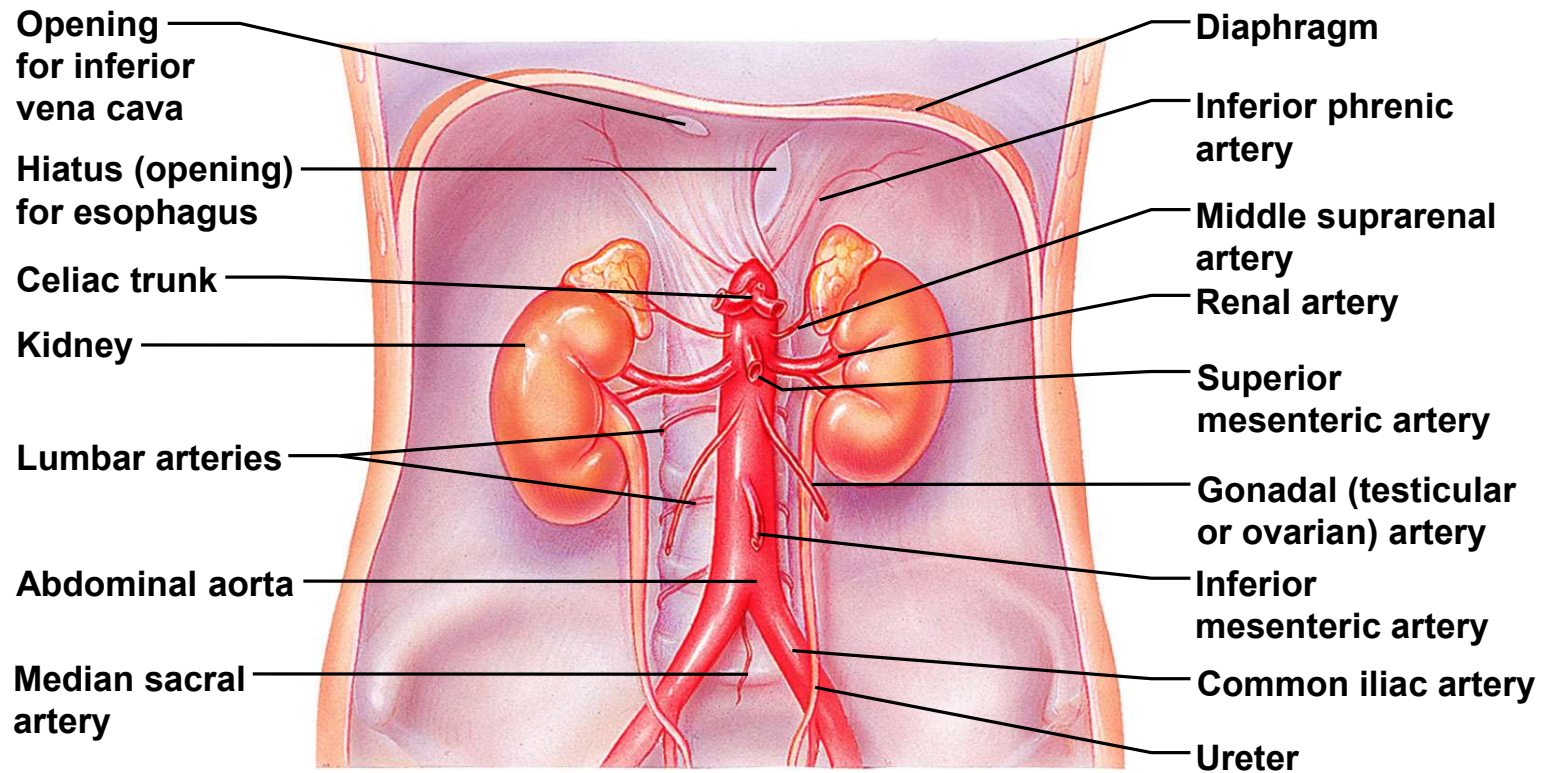


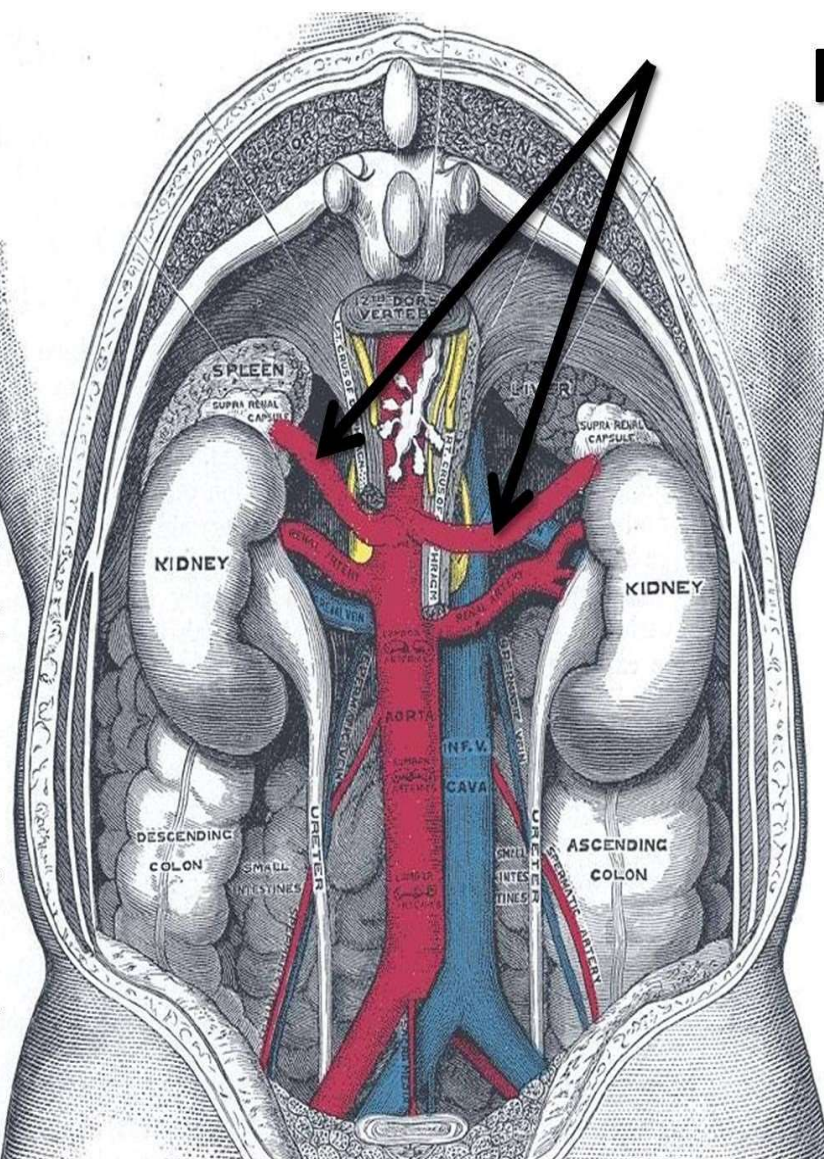
Figure 19.23b

Arteries of the Abdomen

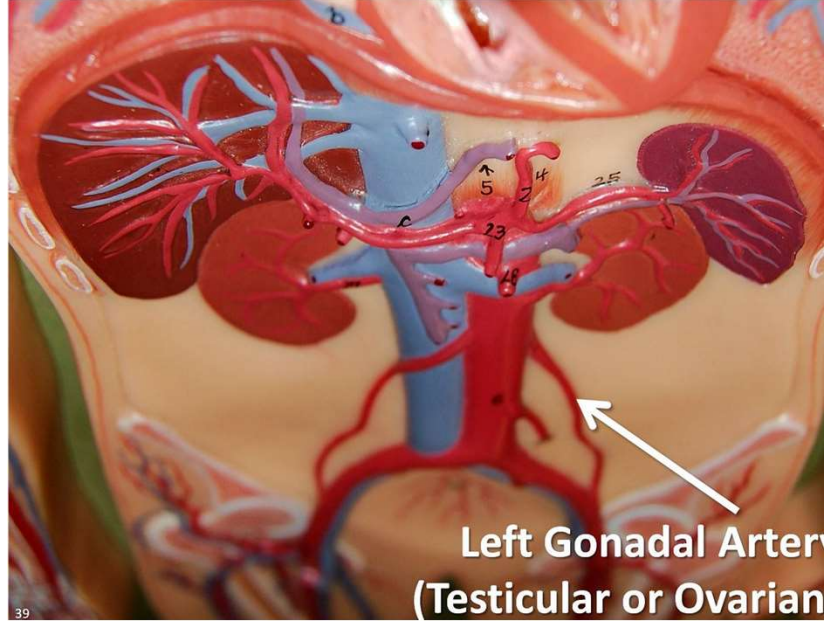
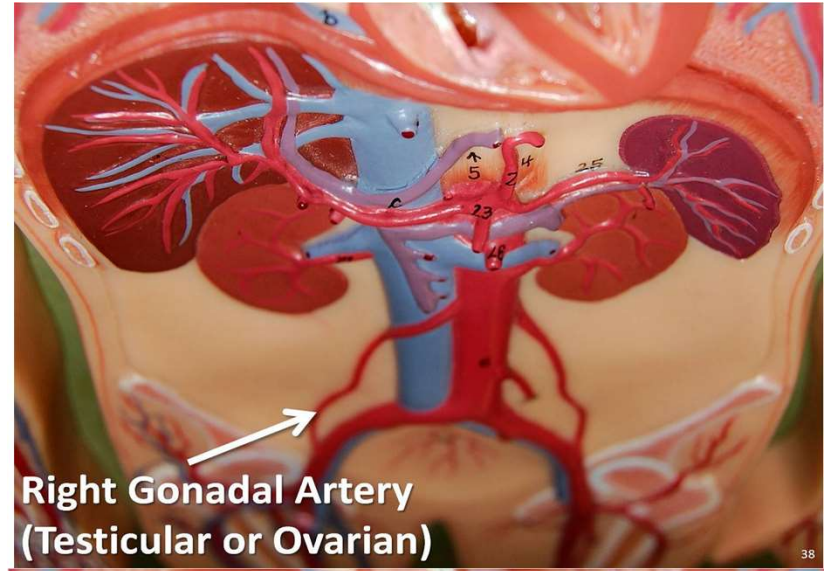


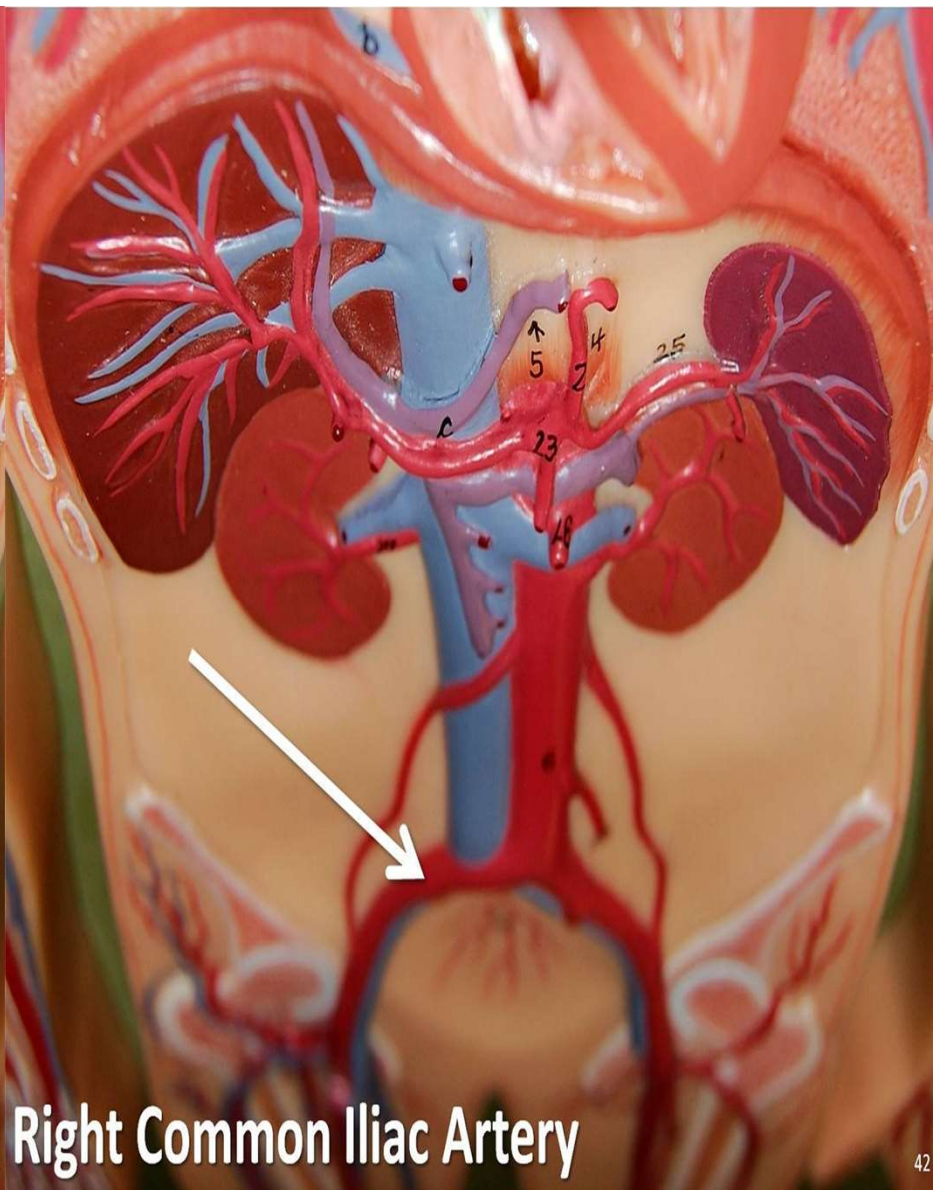
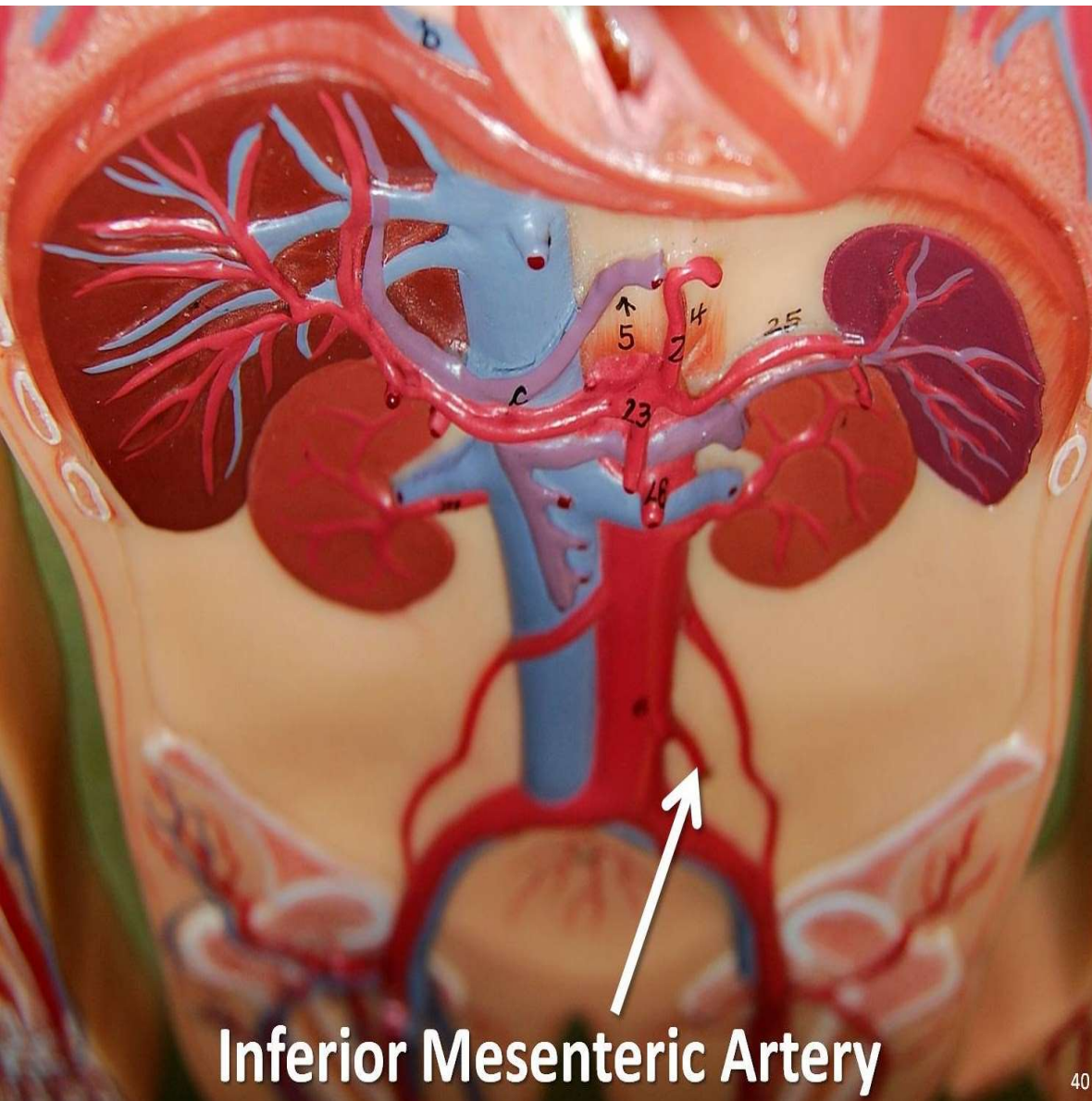
(c)

Figure 19.23c

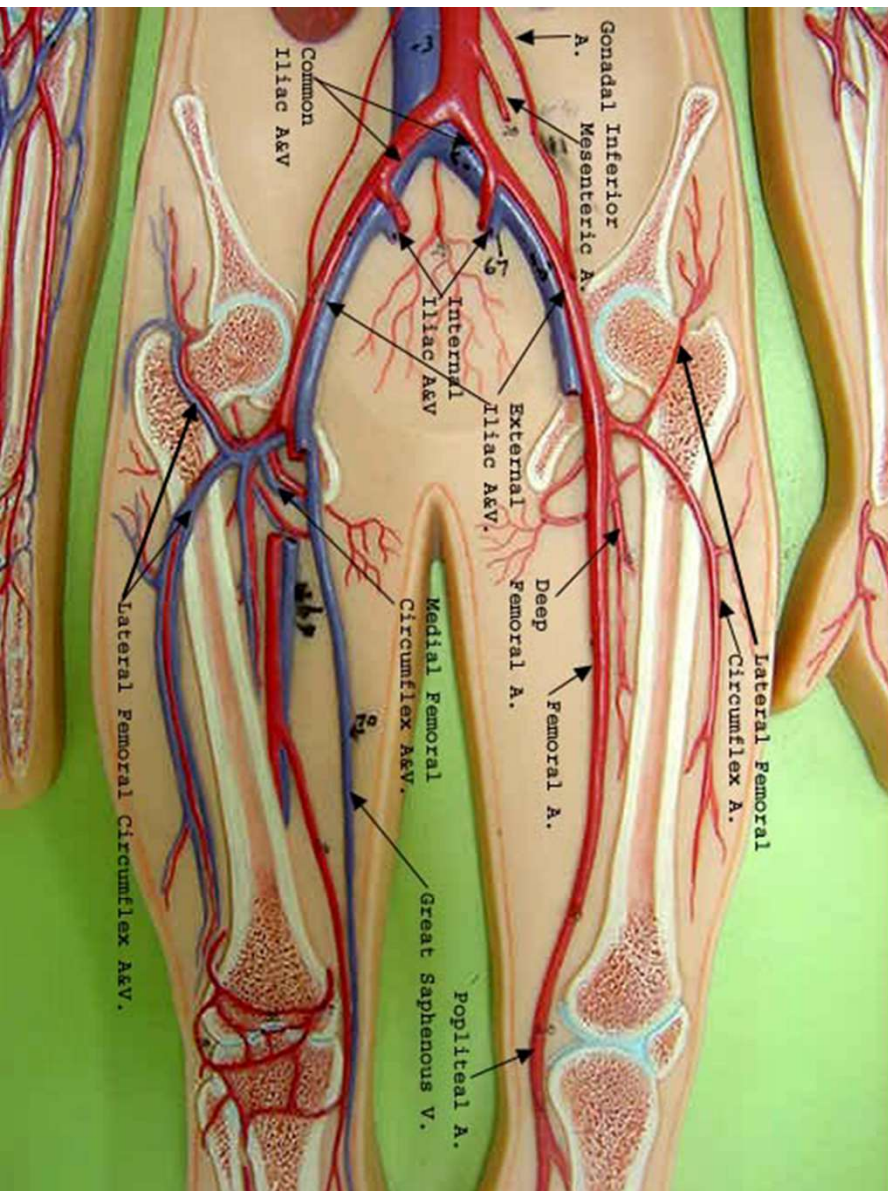


Right and Left Suprarenal (Adrenal) Arteries





INFERIOR APPENDAGES



Common iliac artery

Internal iliac artery

Superior gluteal artery

External iliac artery

Deep artery of thigh

Lateral circumflex femoral artery

Medial circumflex femoral artery

Obturator artery

Femoral artery

Adductor hiatus

Popliteal artery

Anterior tibial artery

Posterior tibial artery

Fibular artery

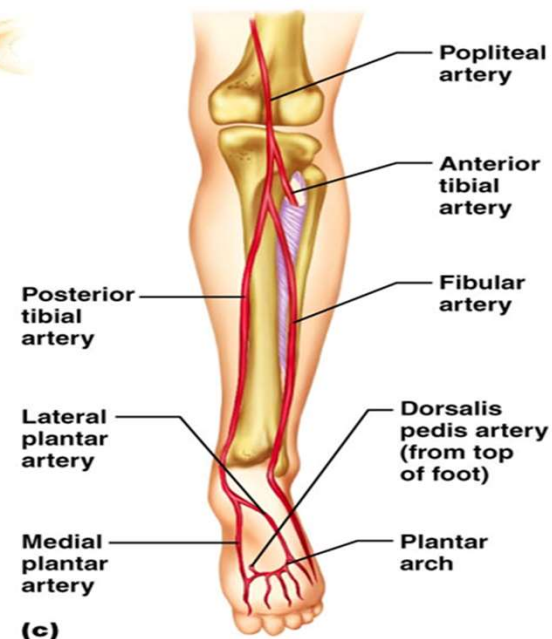
Dorsalis pedis artery

Arcuate artery

Metatarsal arteries

(b)

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(c)

Arteries of the Lower Limbs

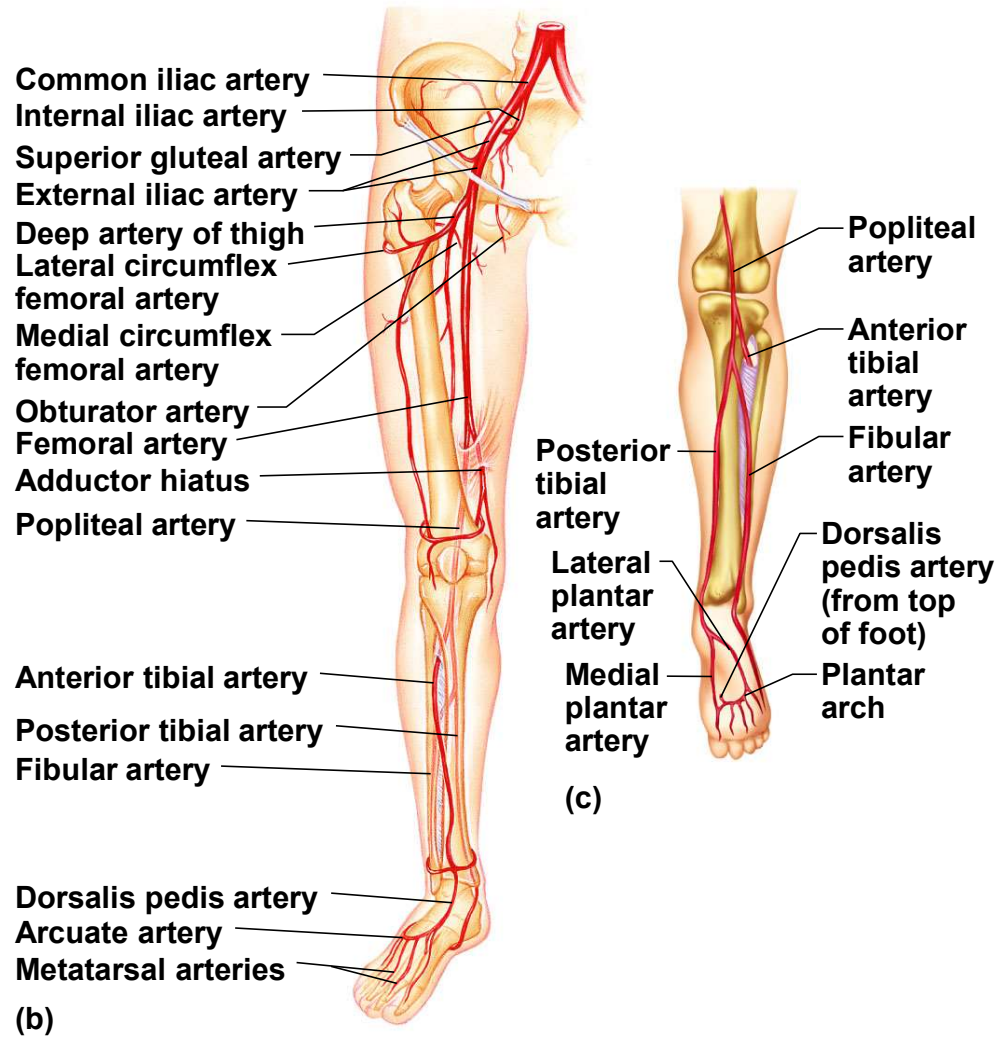
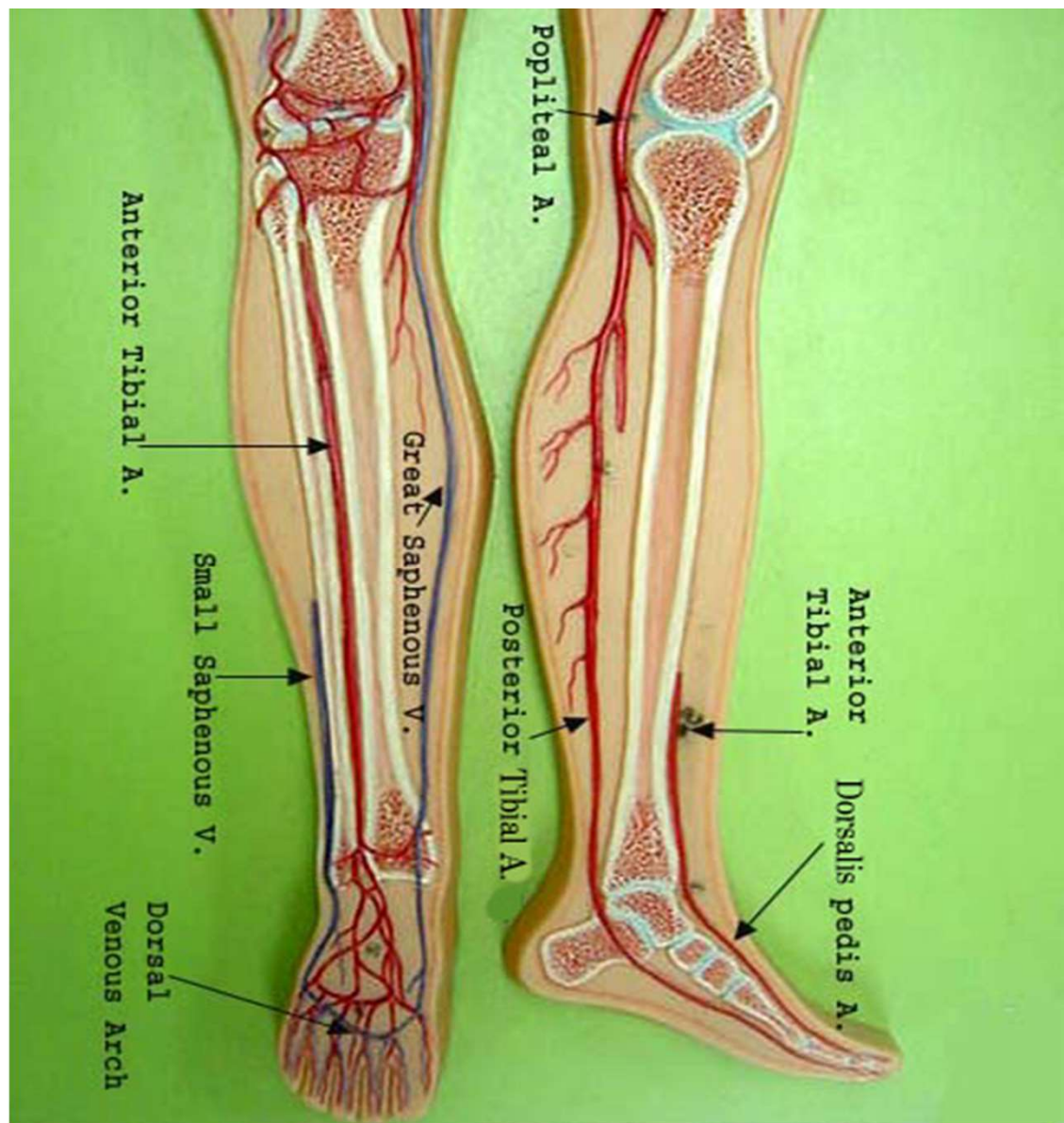
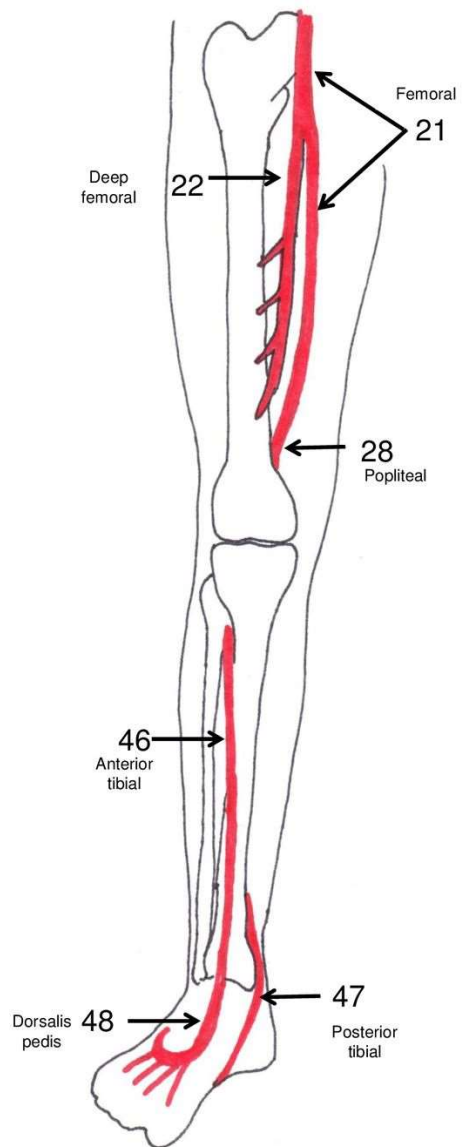
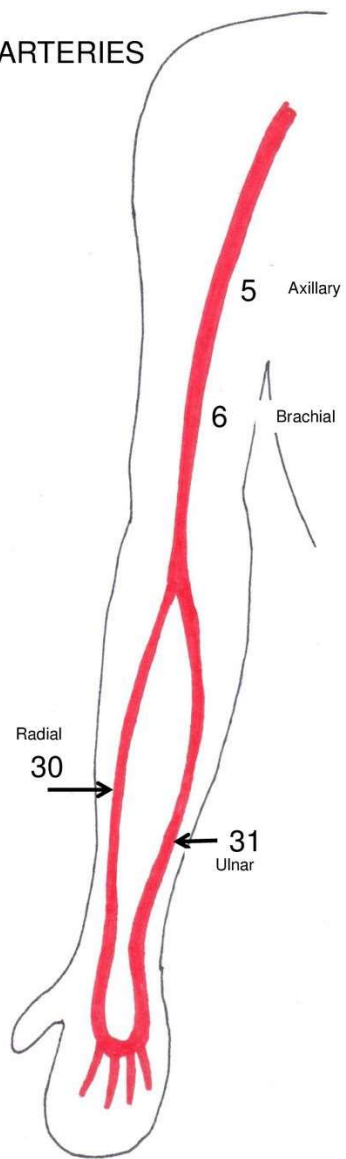
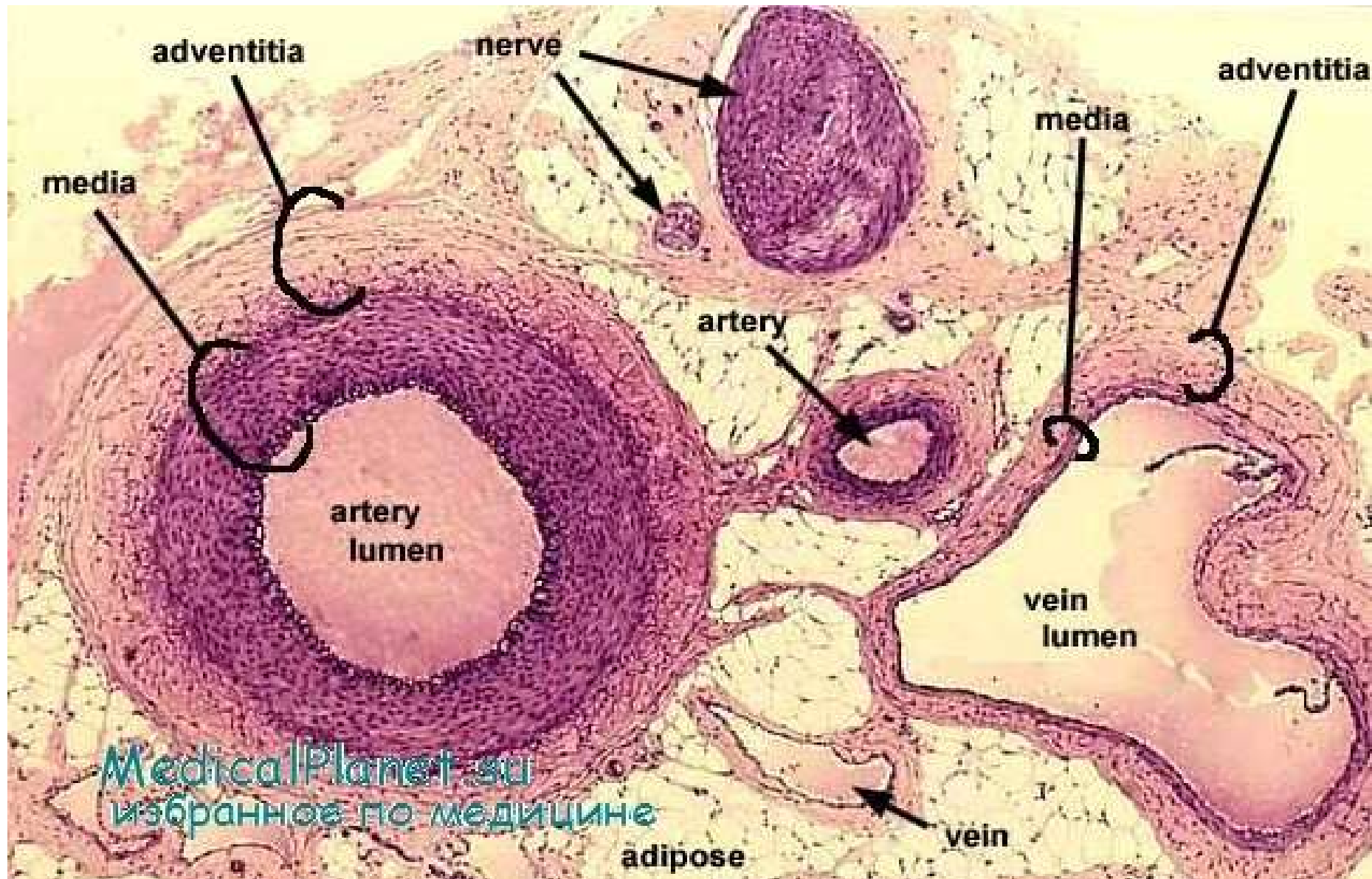


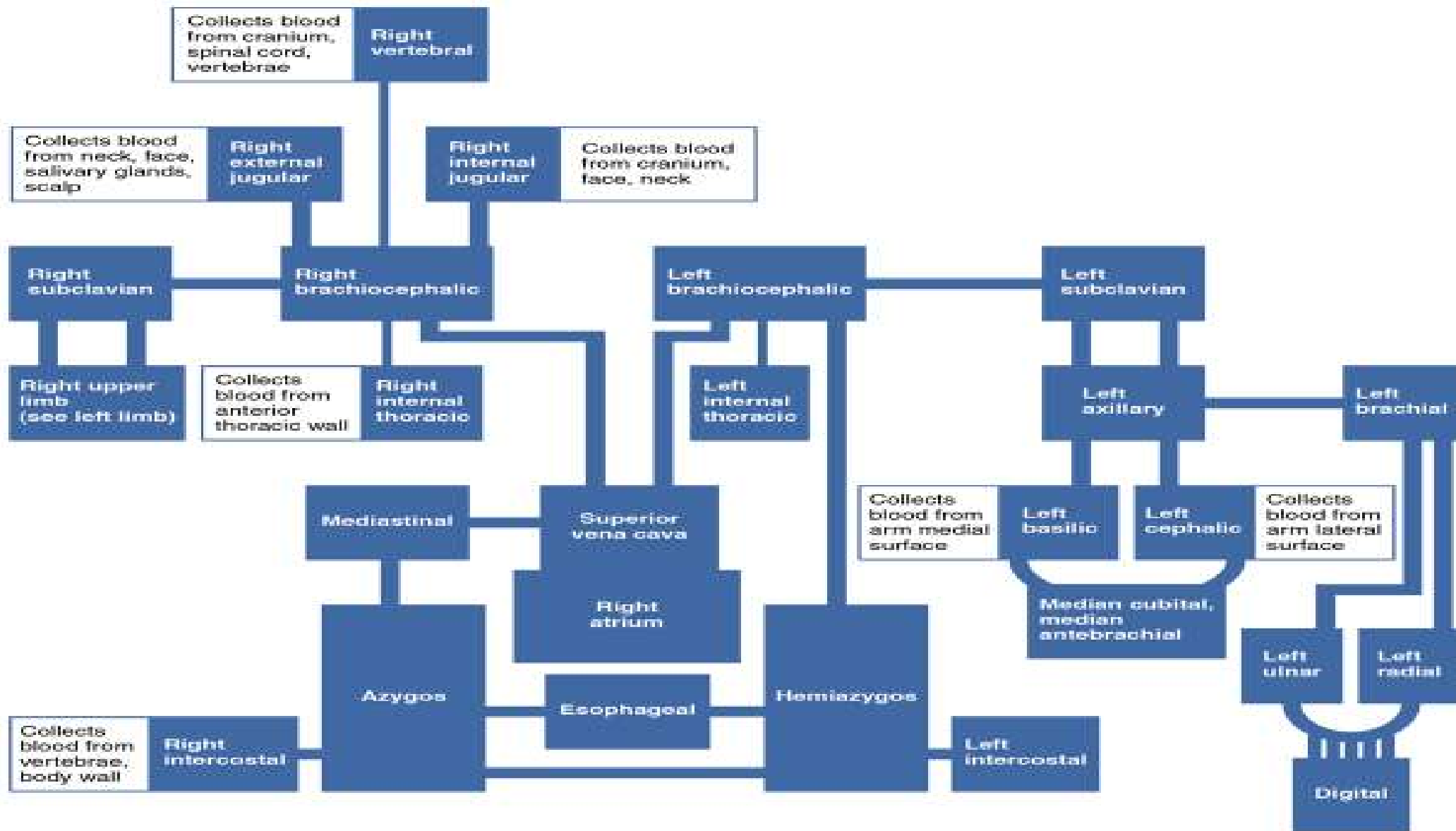
Figure 19.24b, c

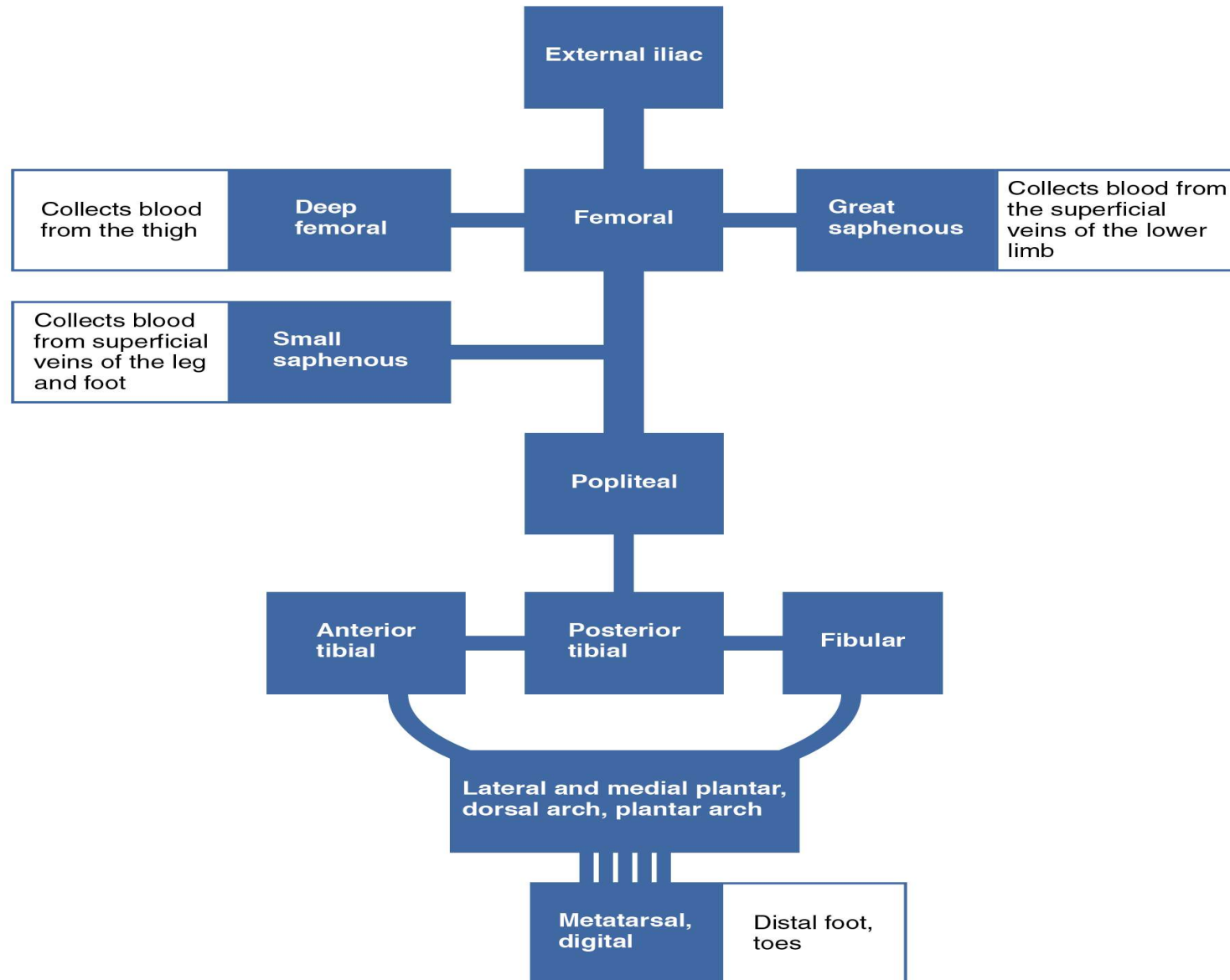
ARTERIES

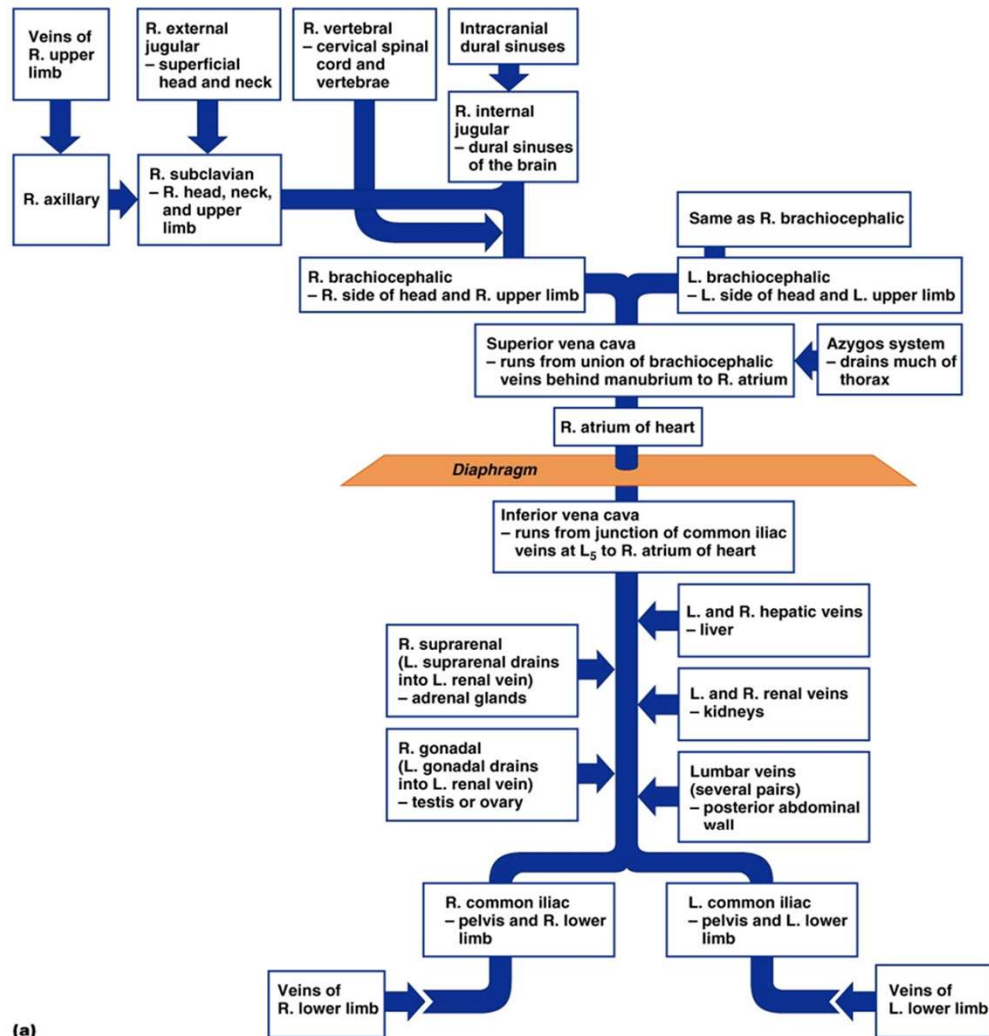


Veins

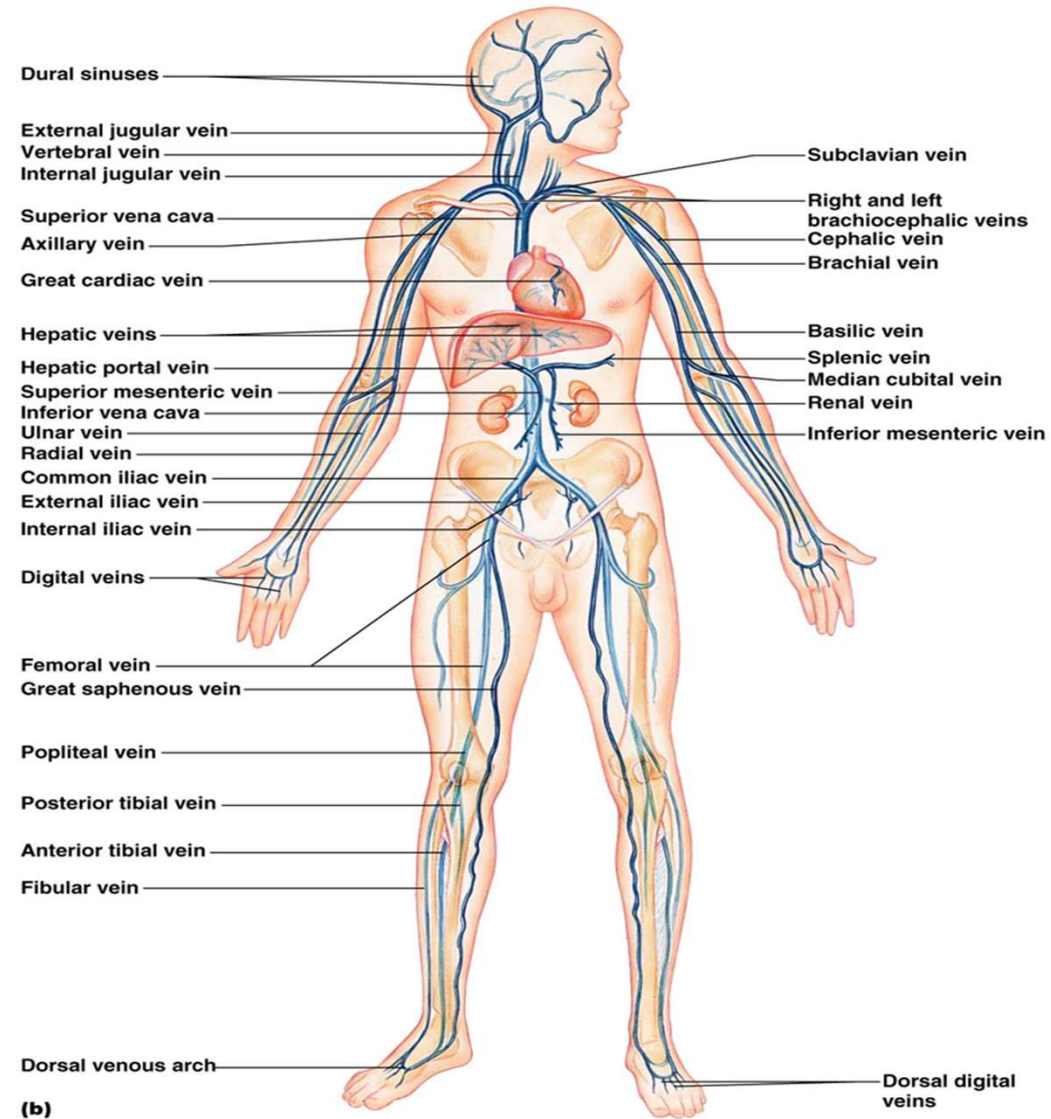




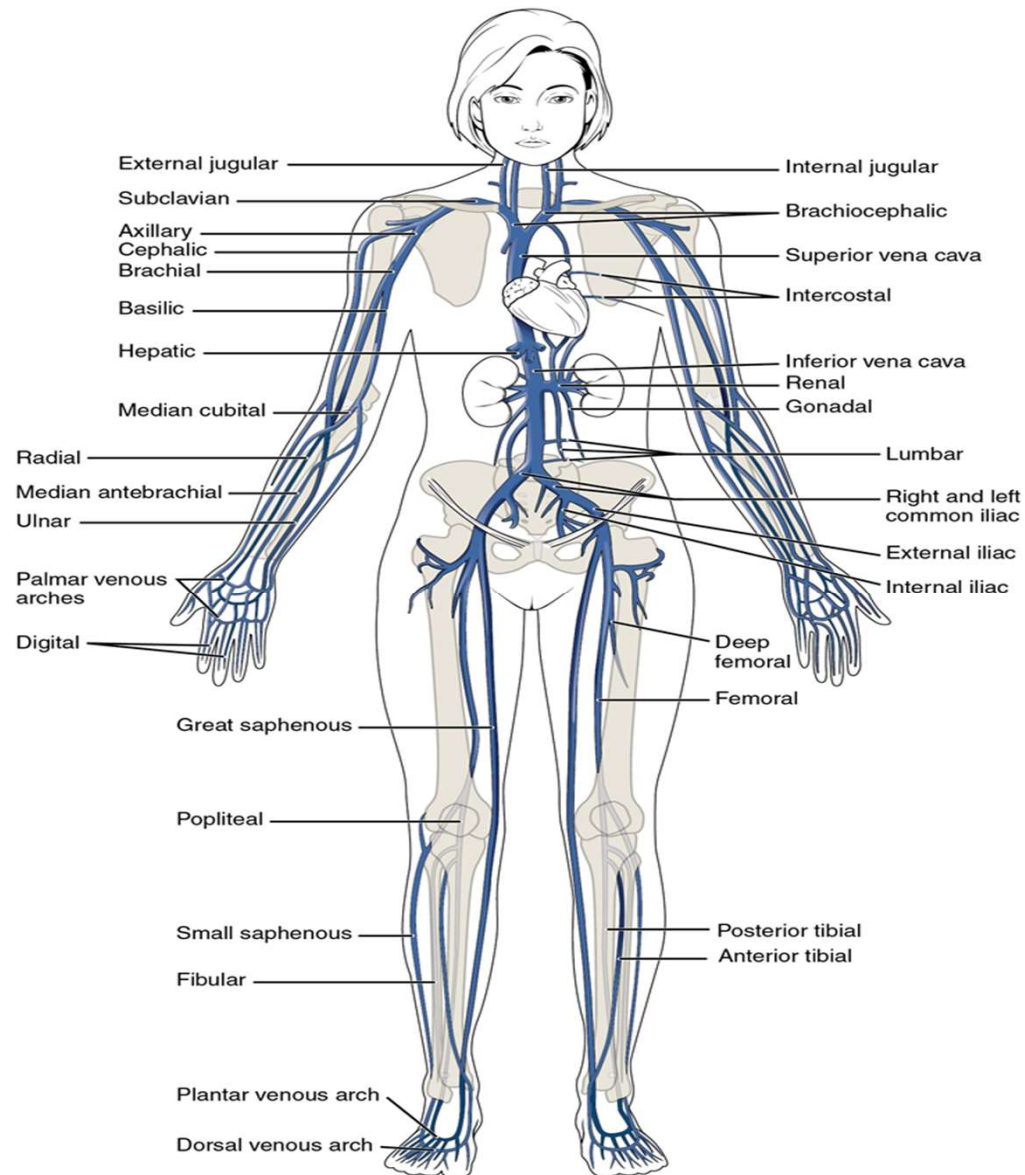


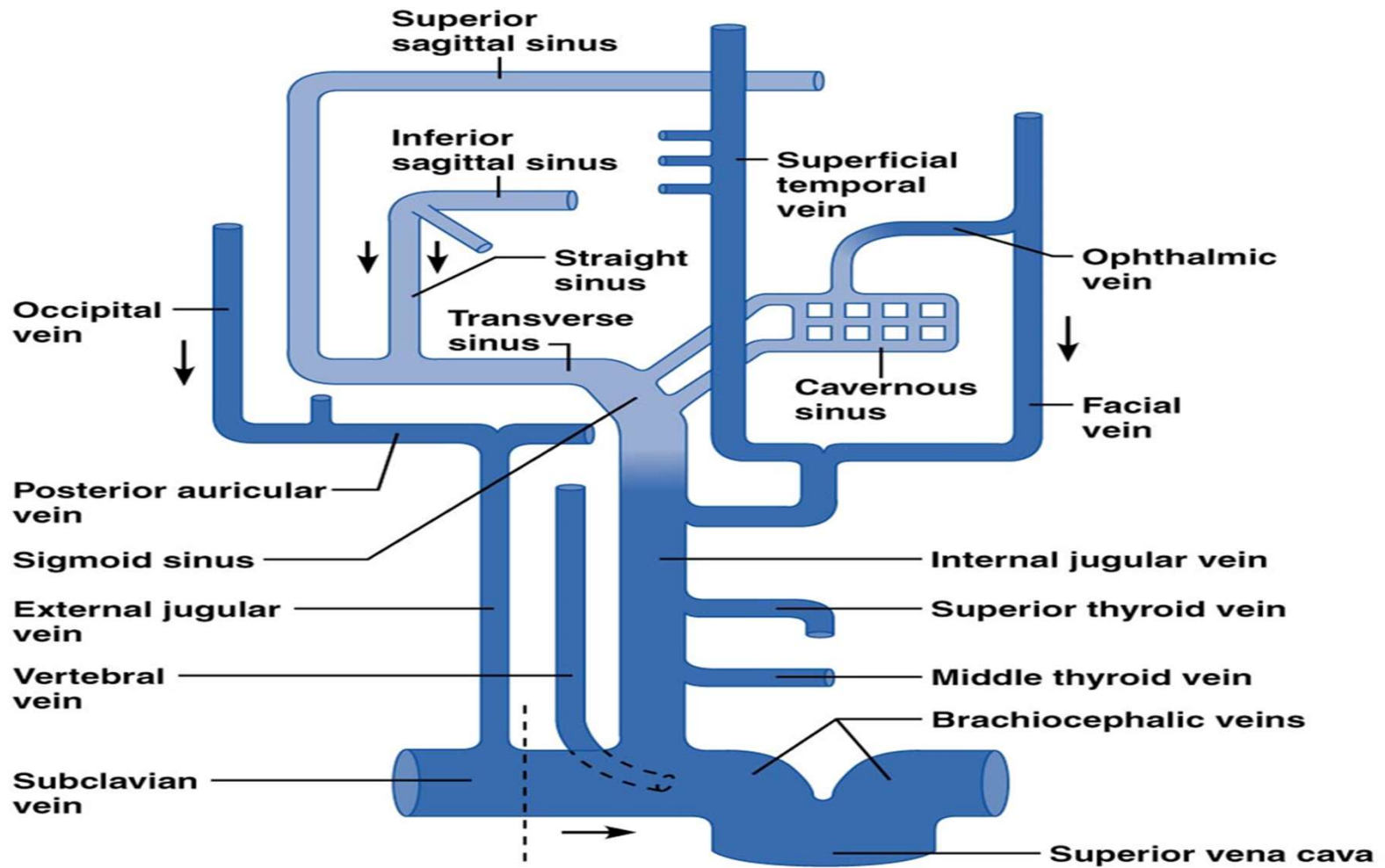


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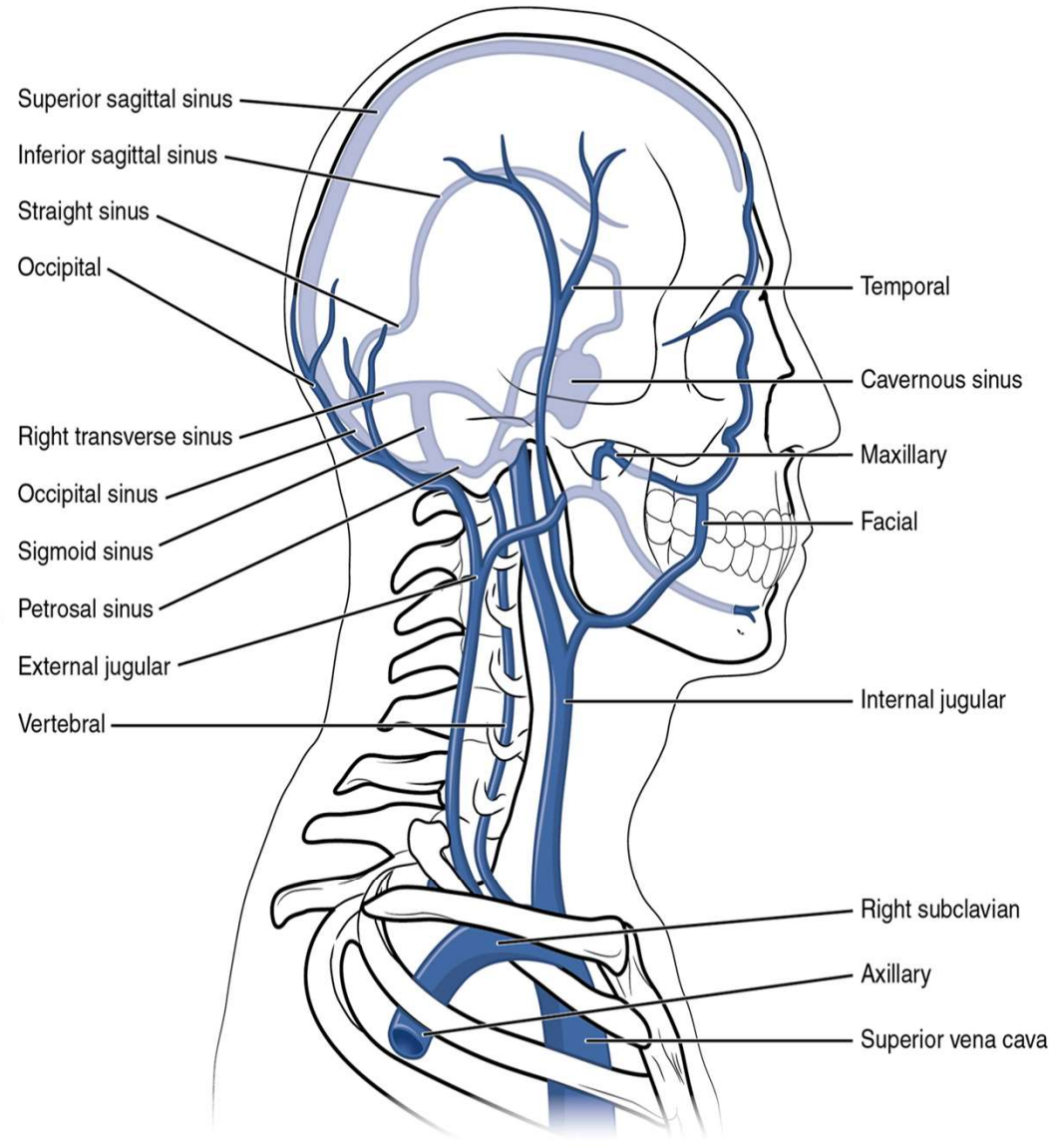
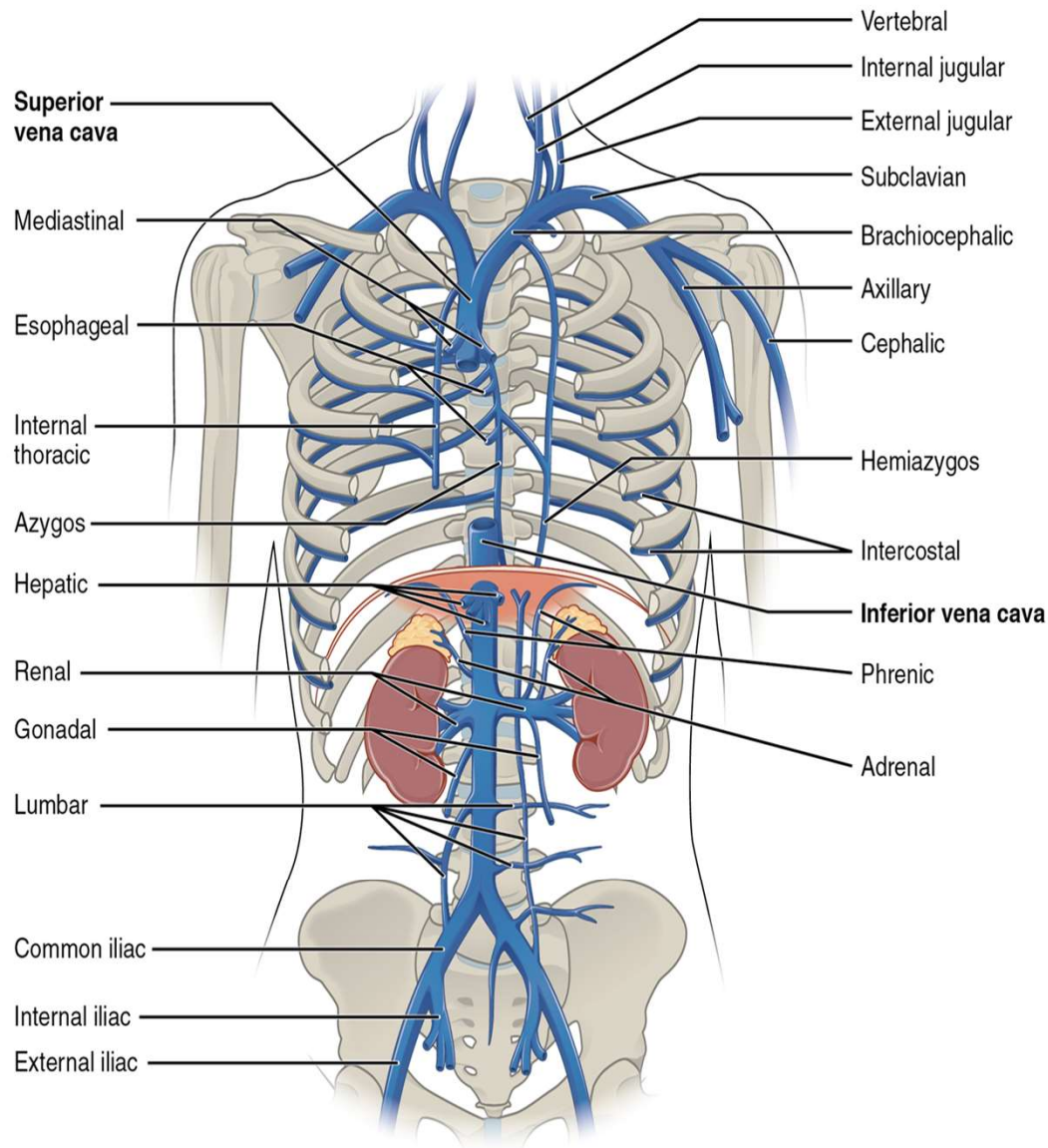


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(a)



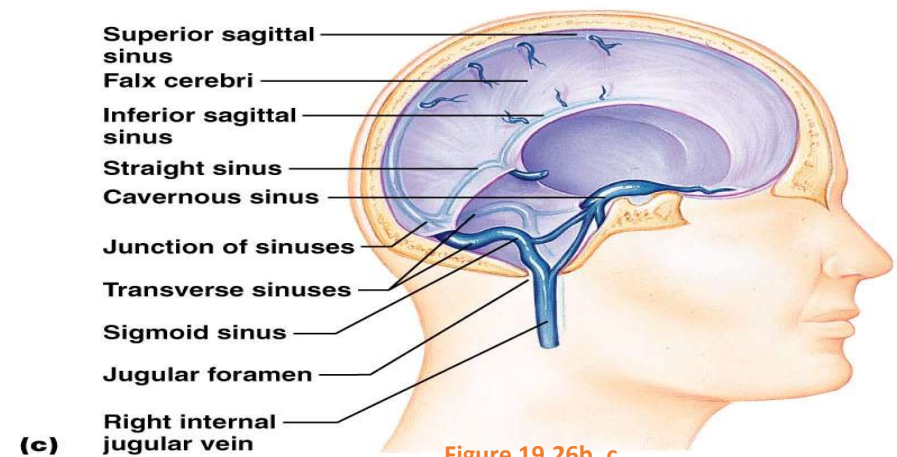
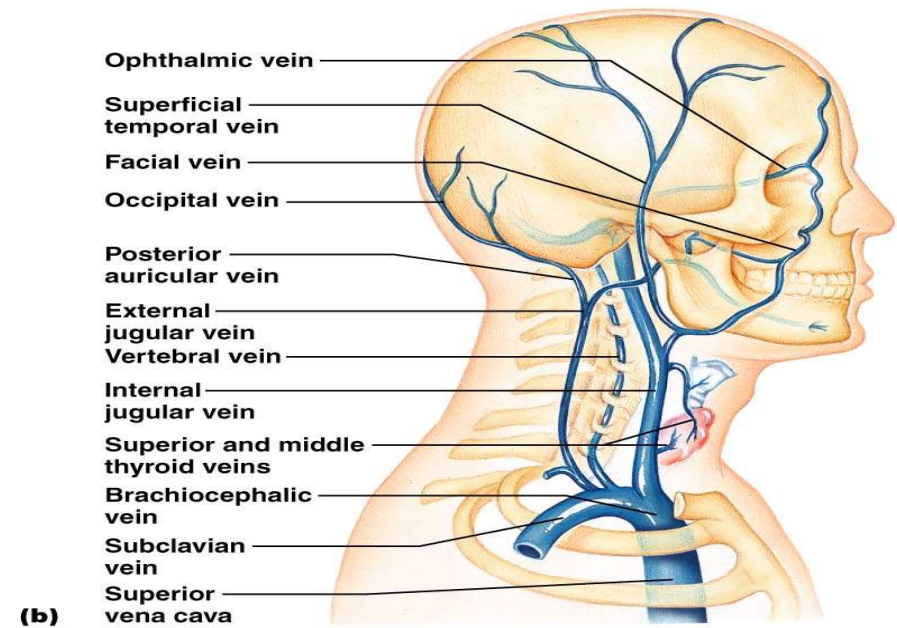
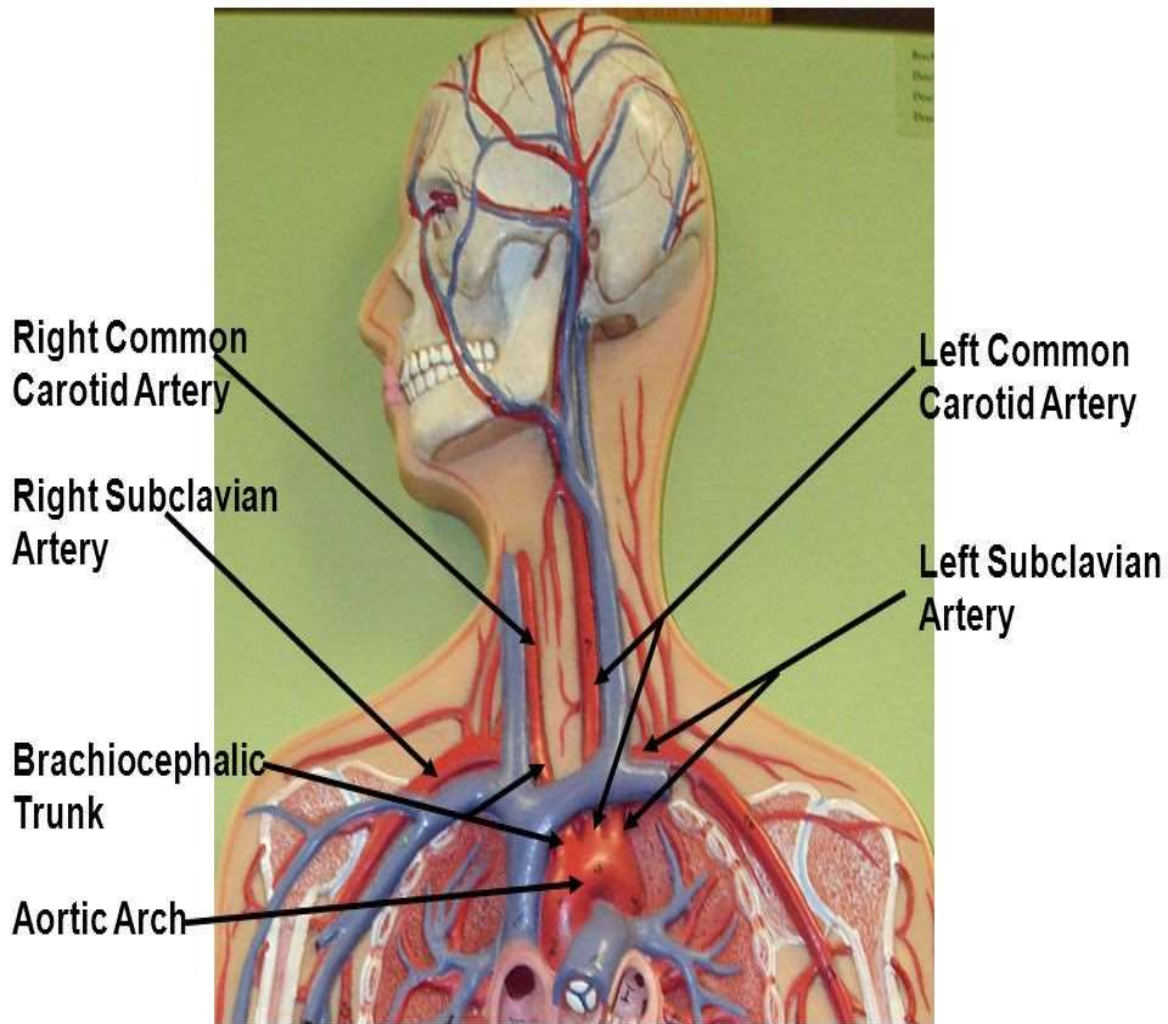


Figure 19.26b, c

Veins of the Abdomen

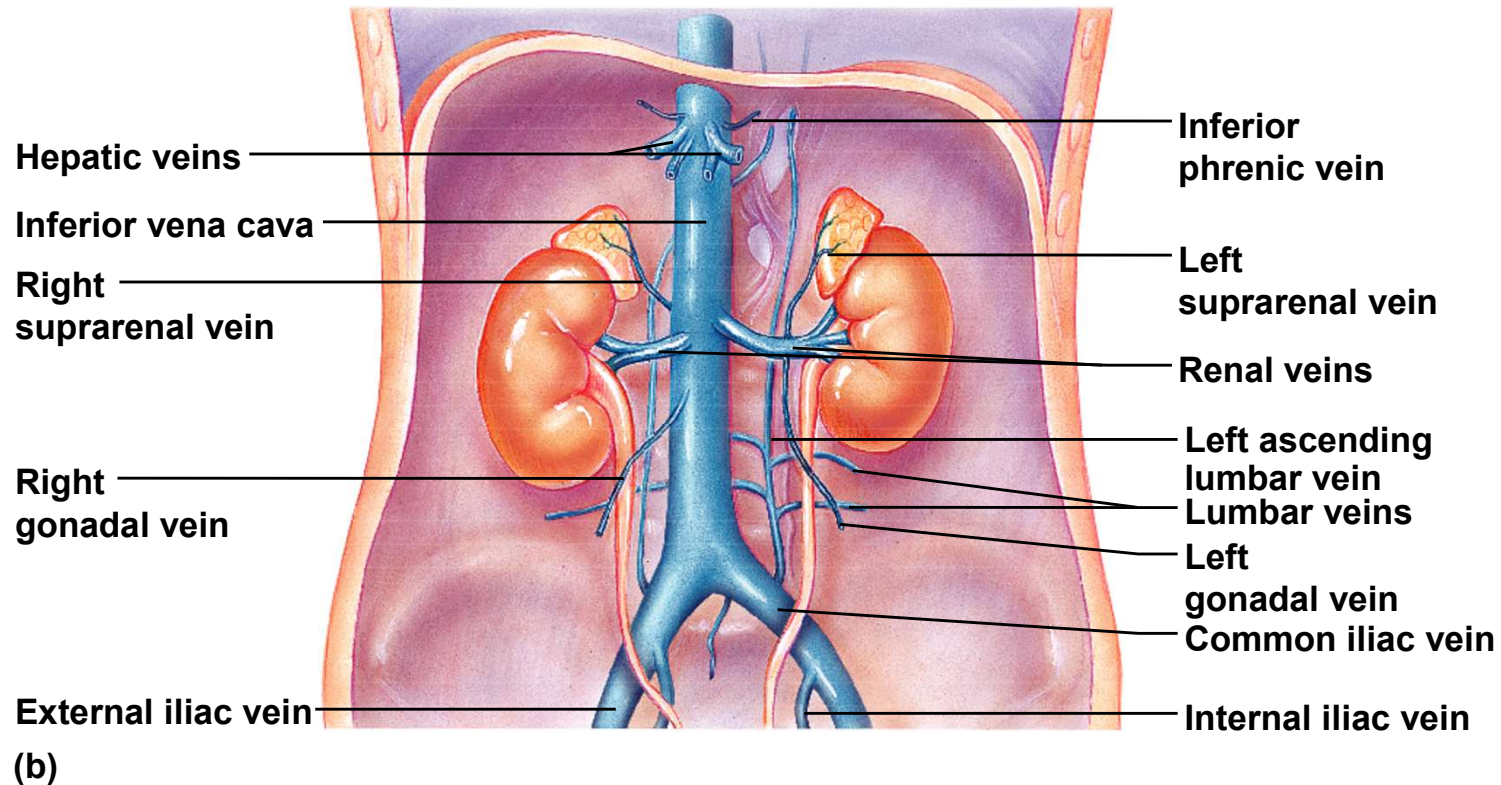


Figure 19.28b

Veins of the Abdomen

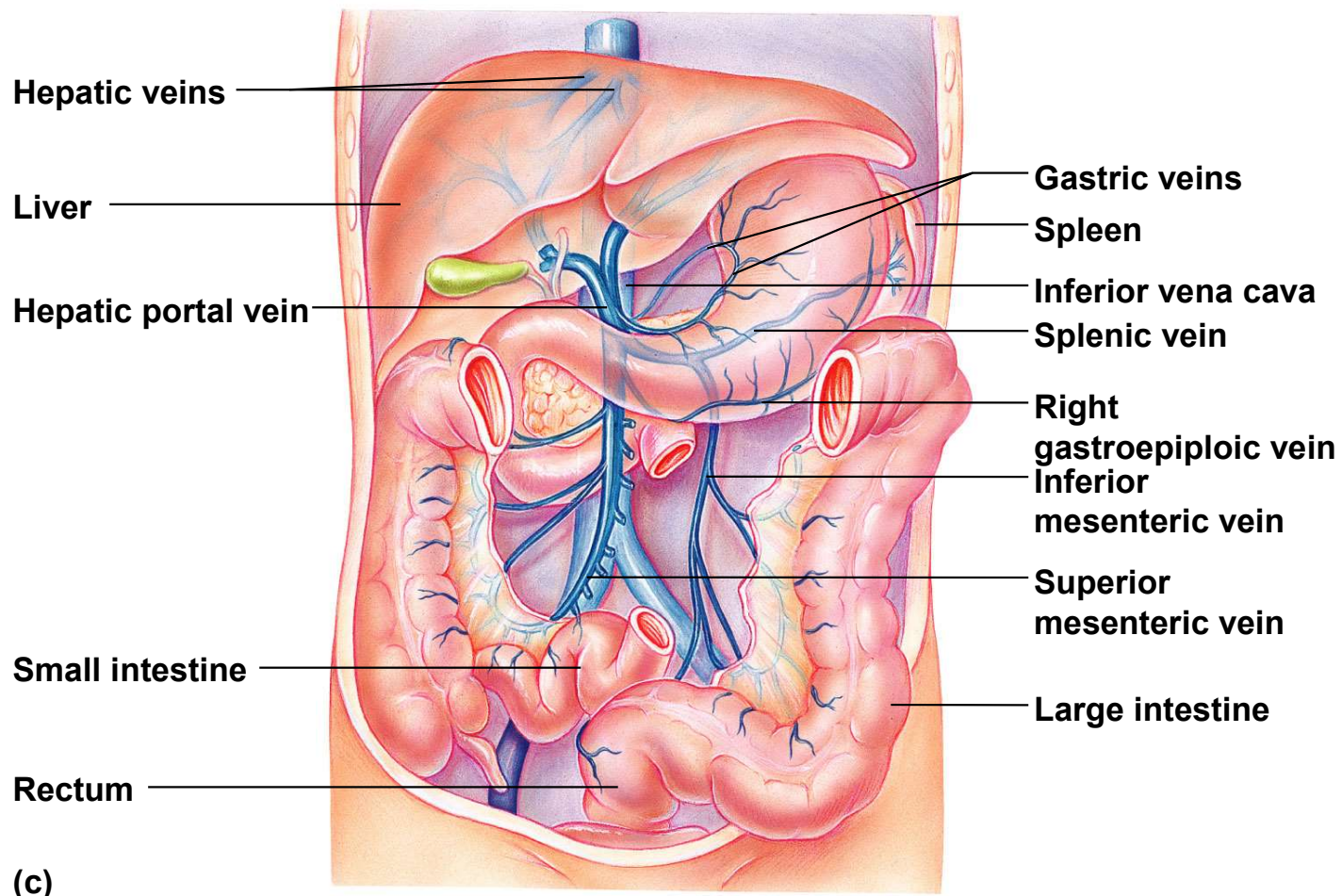
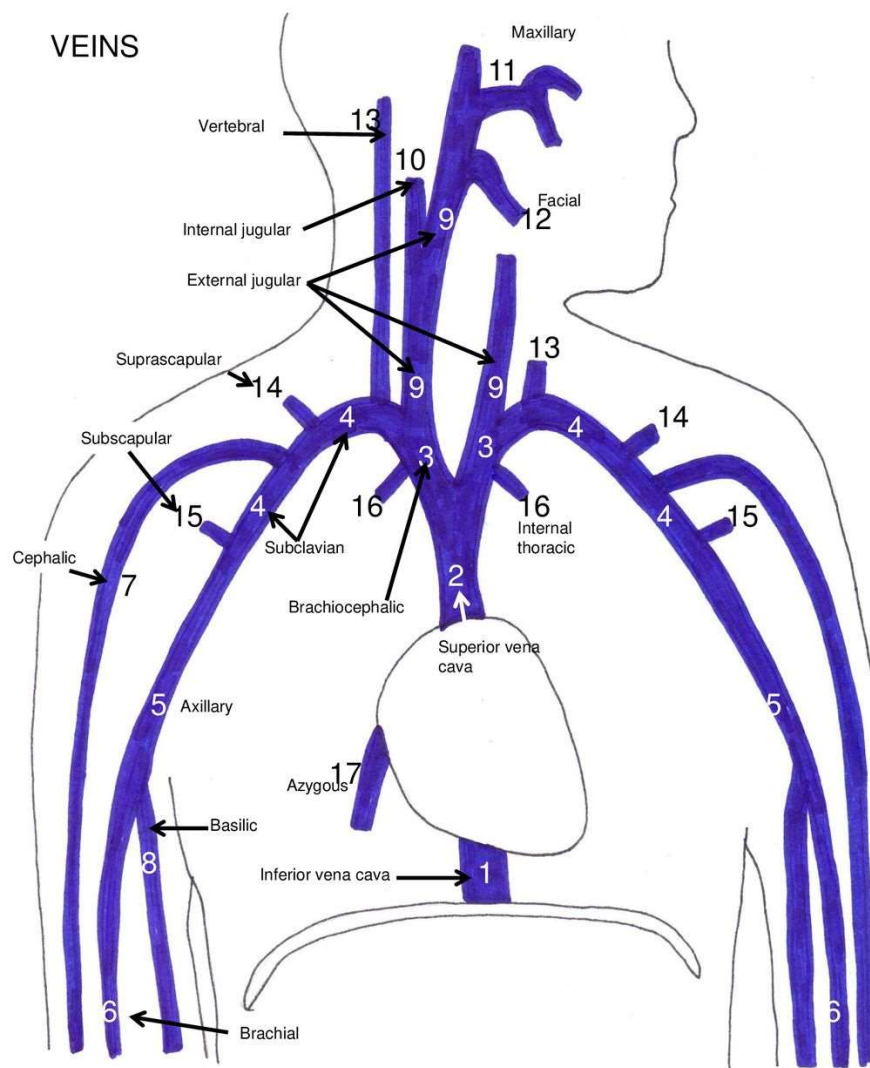
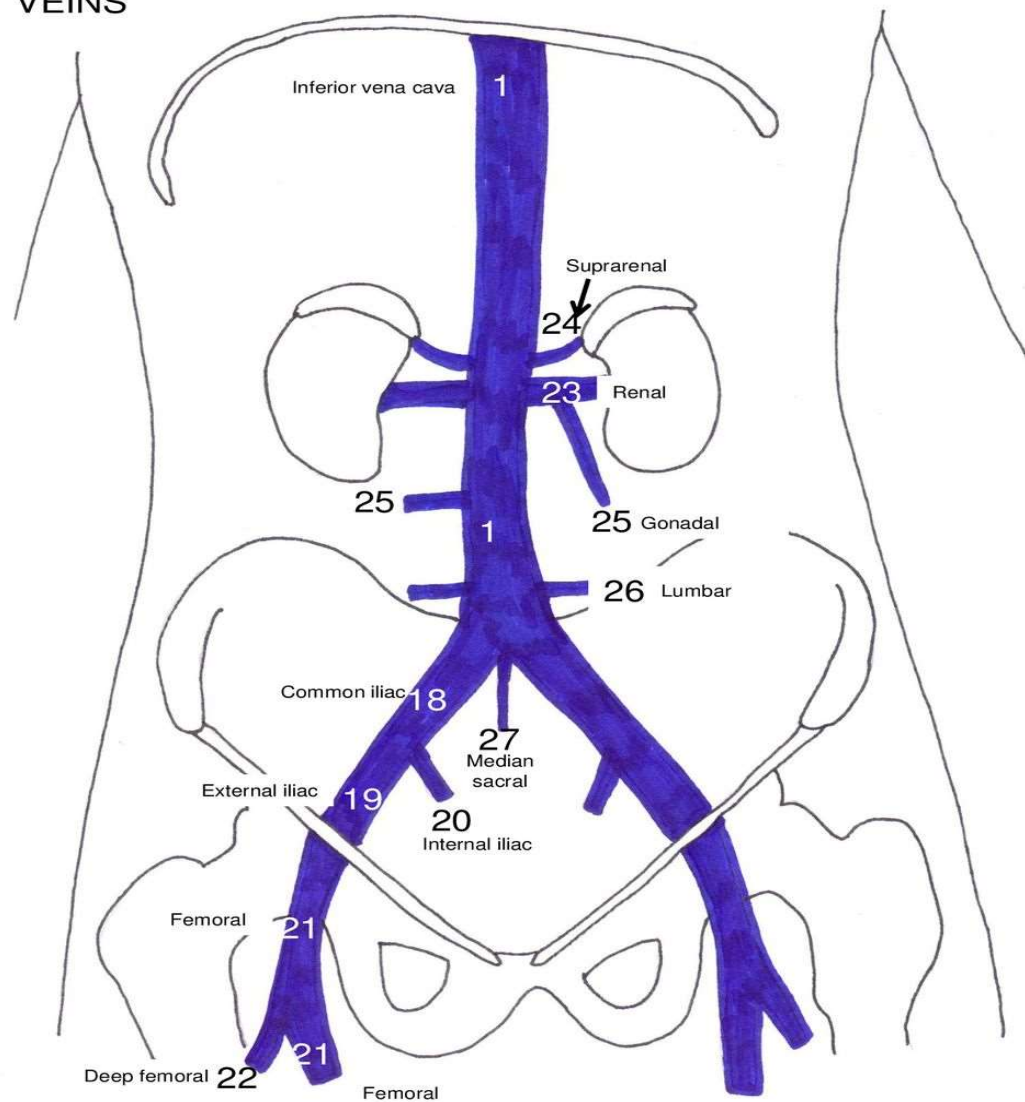


Figure 19.28c

VEINS



VEINS



Veins of the Upper Limbs and Thorax

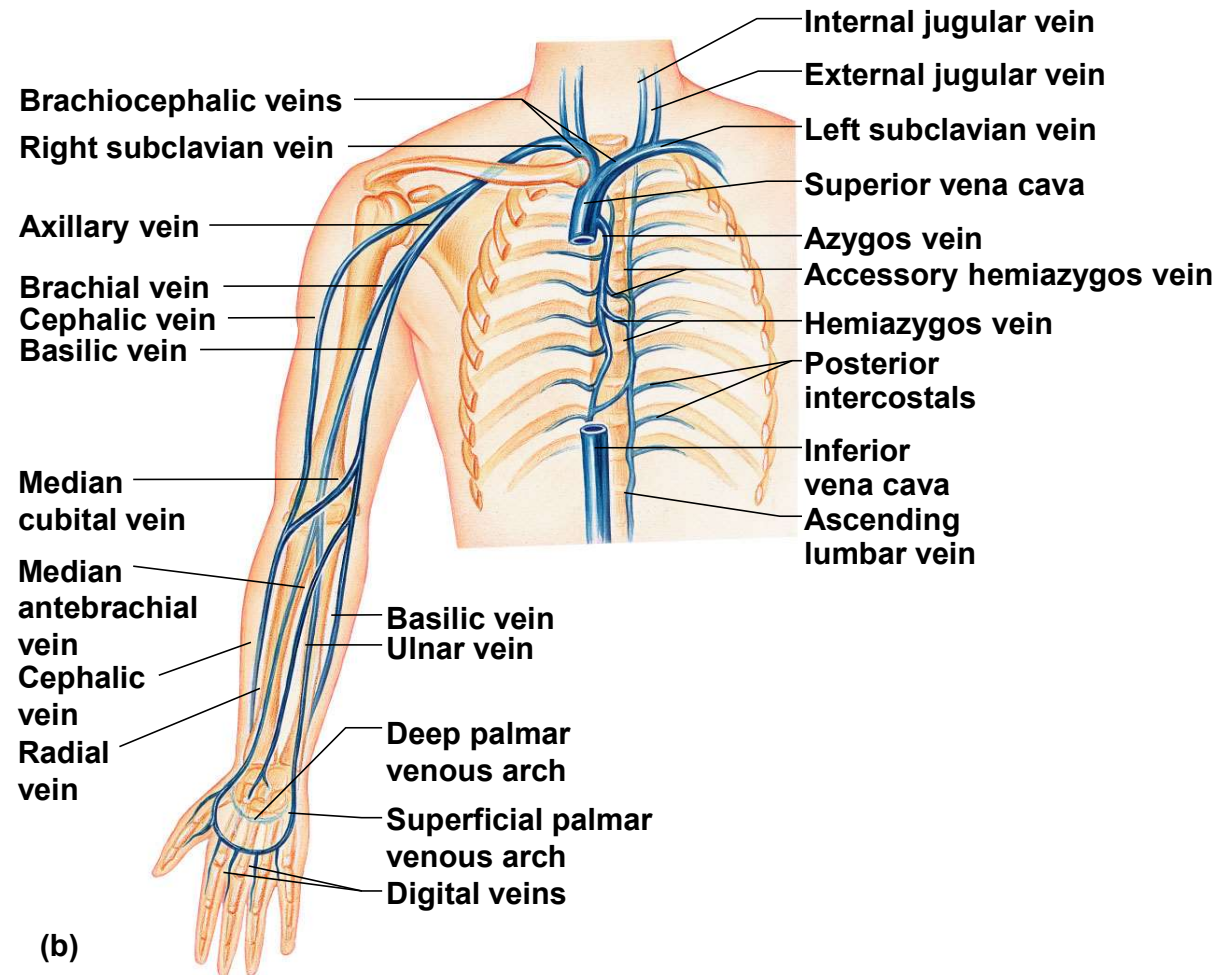
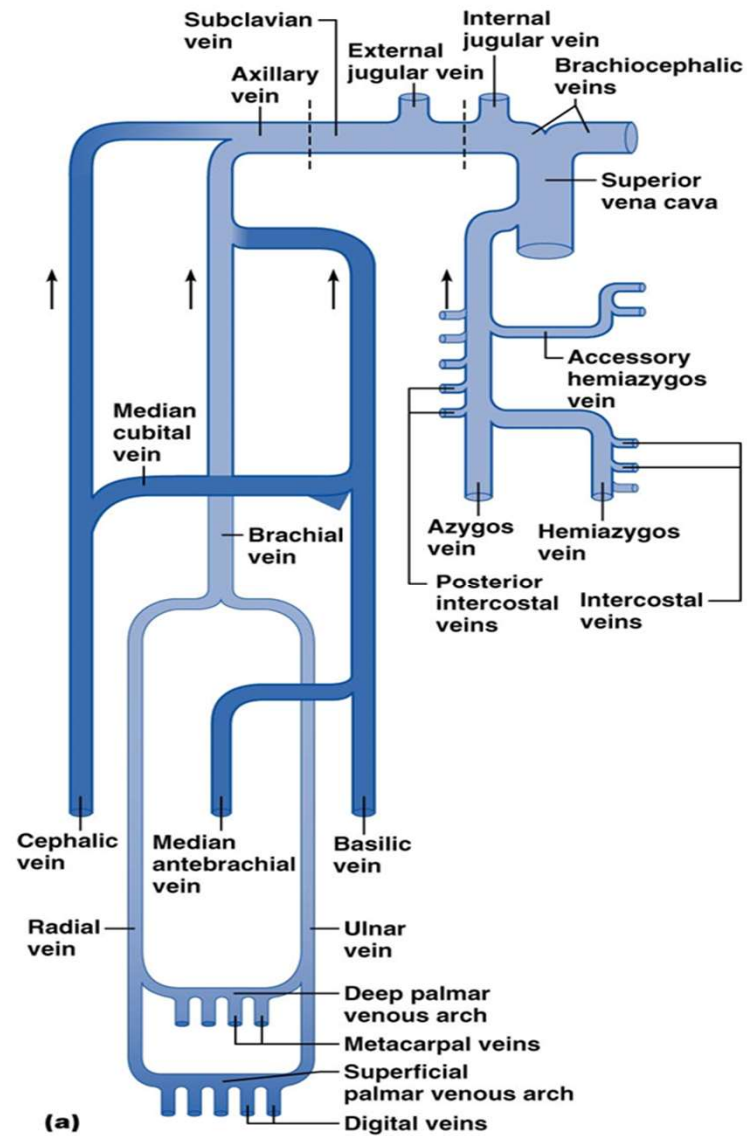
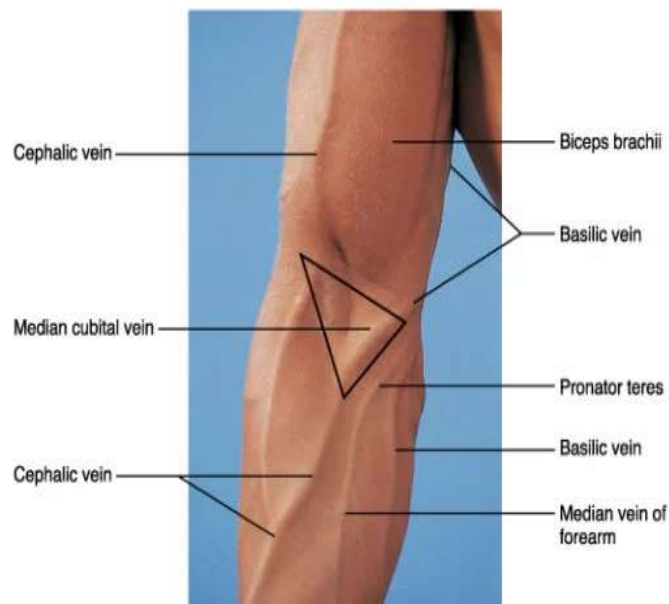
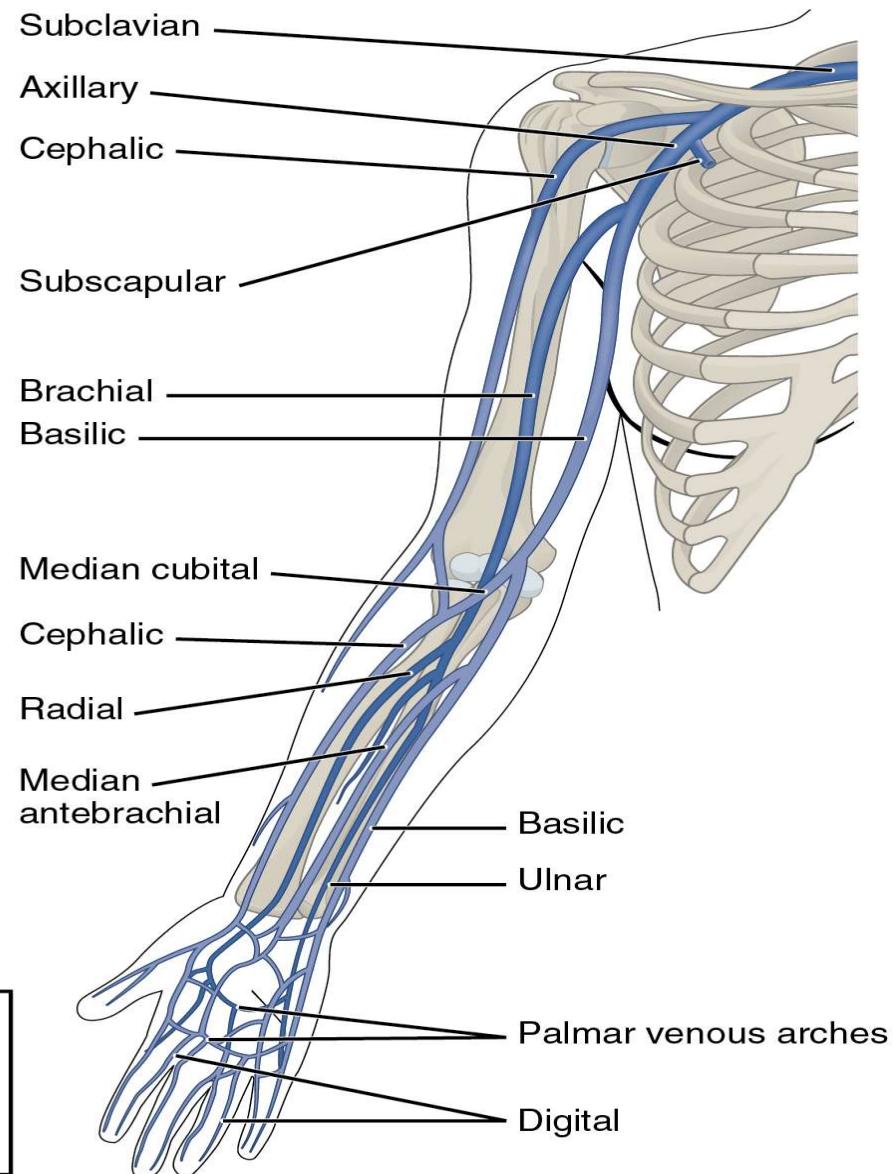
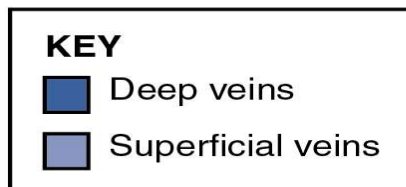


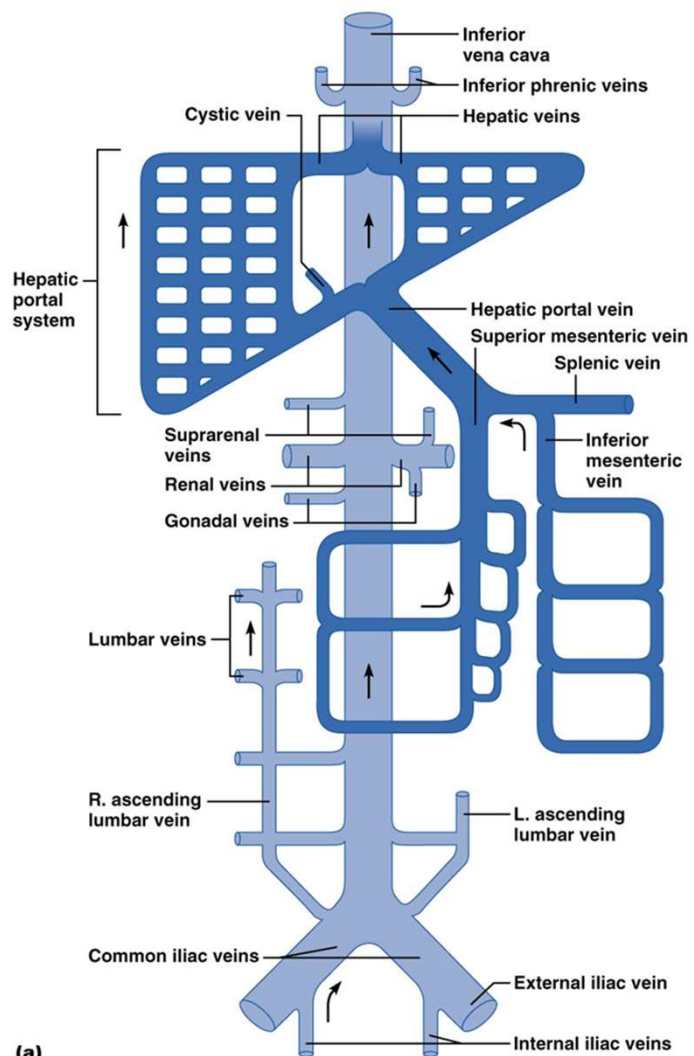
Figure 19.27b





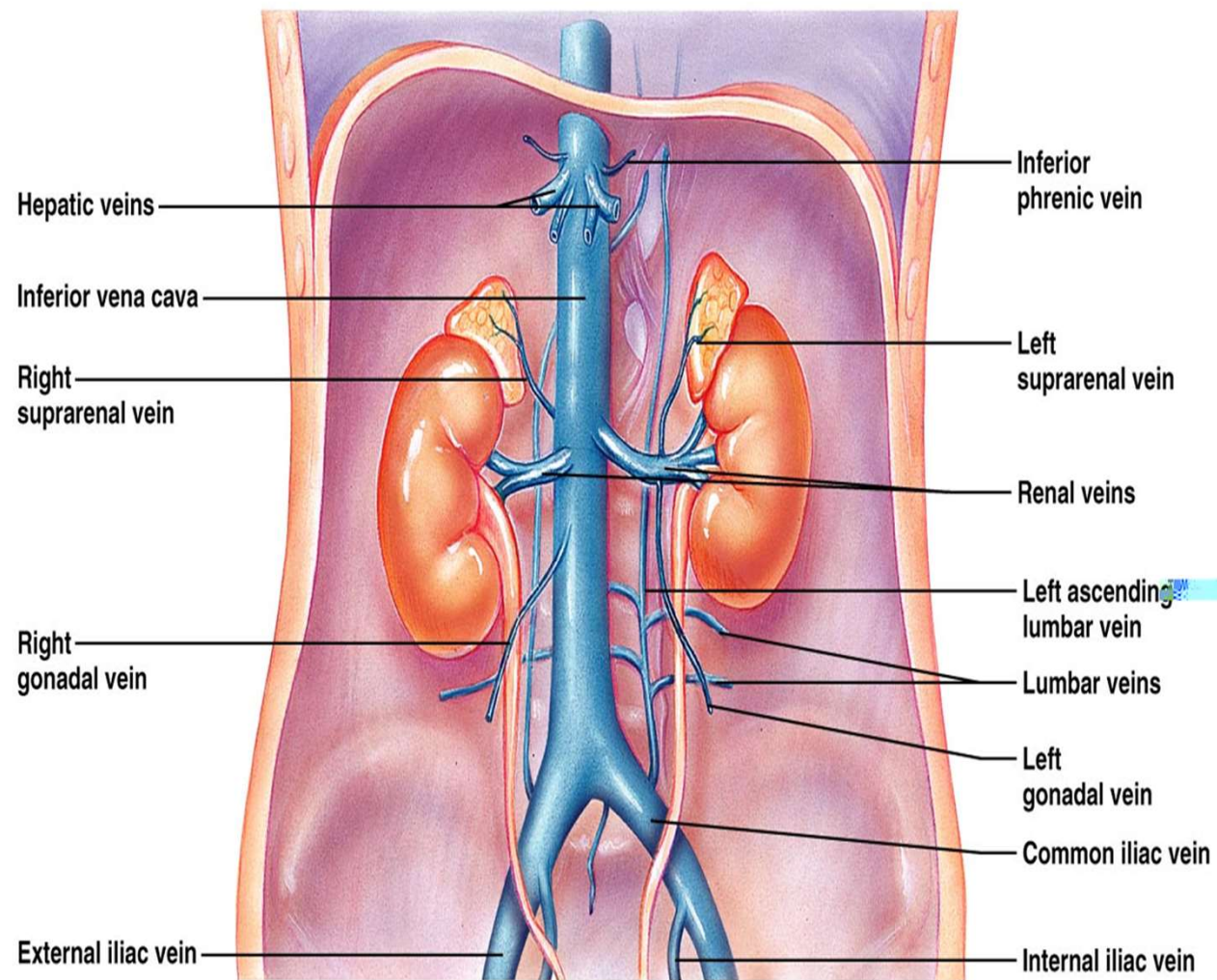
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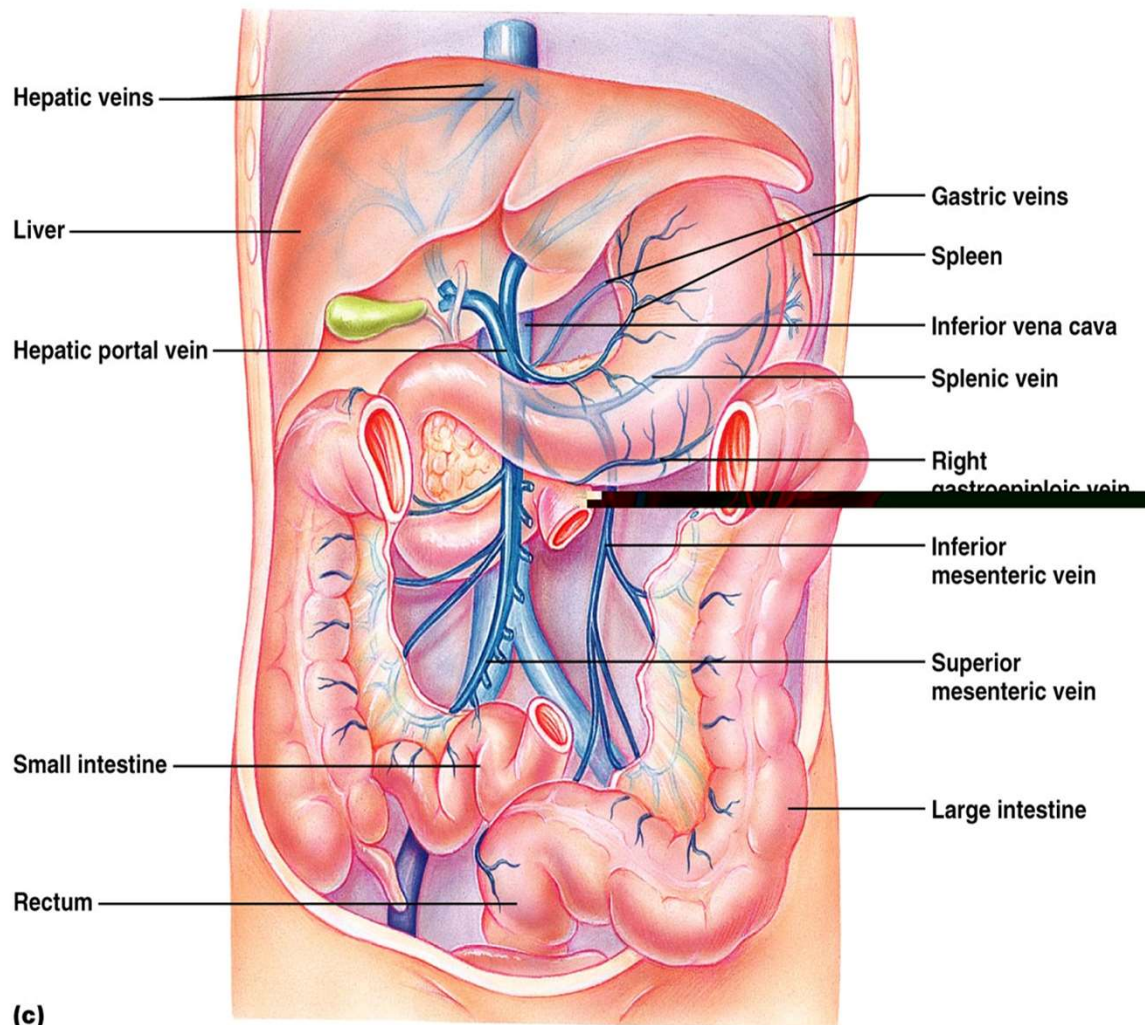
(a)

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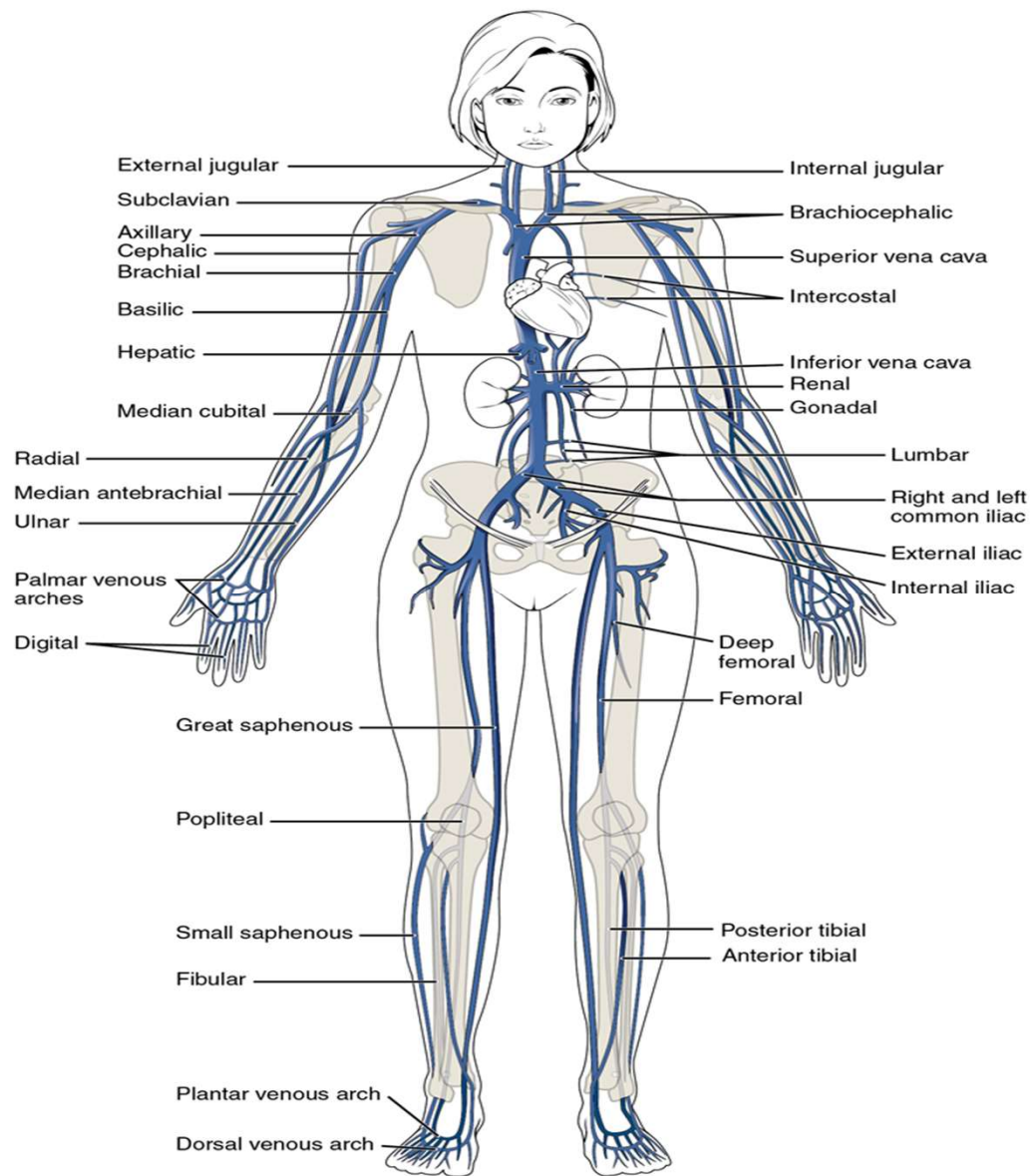
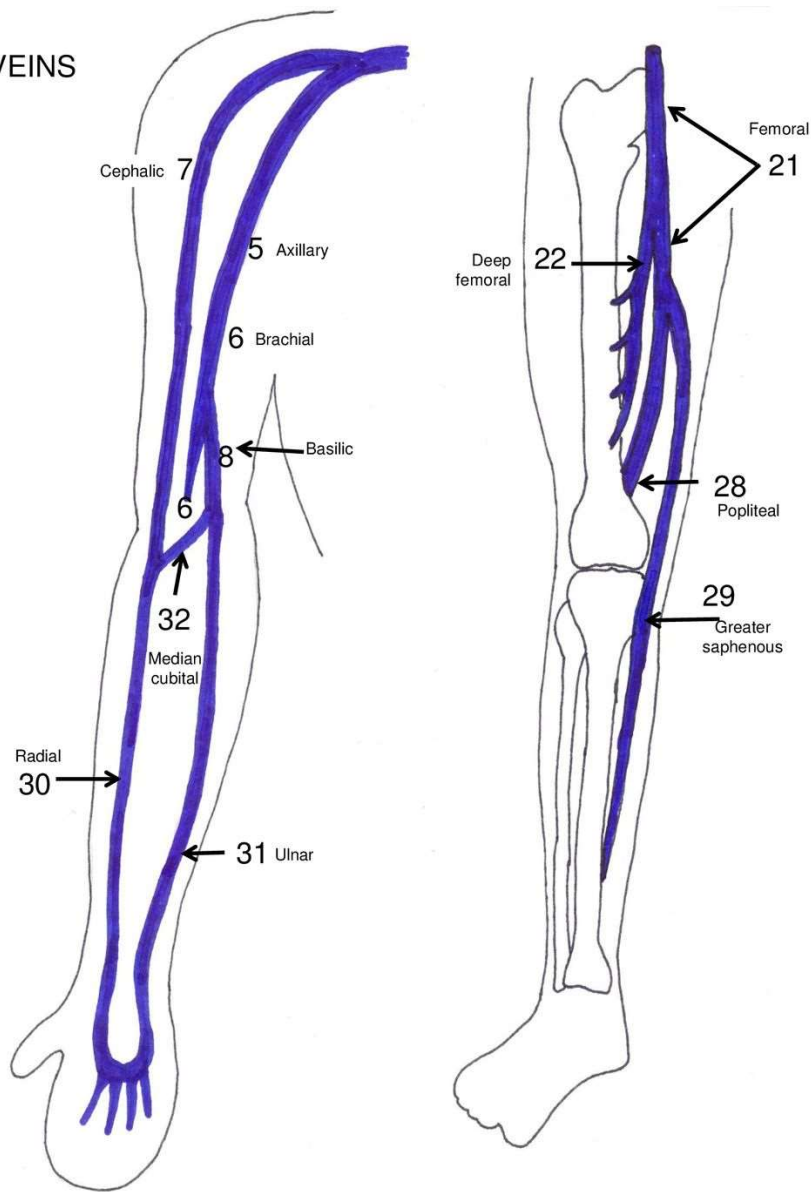
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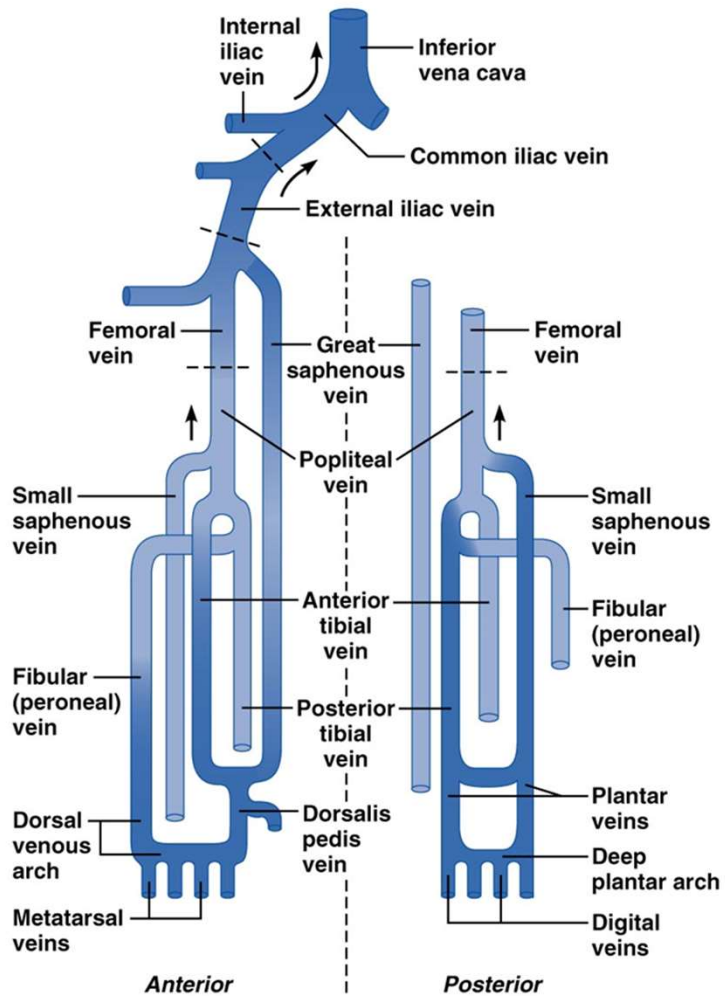
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(c)

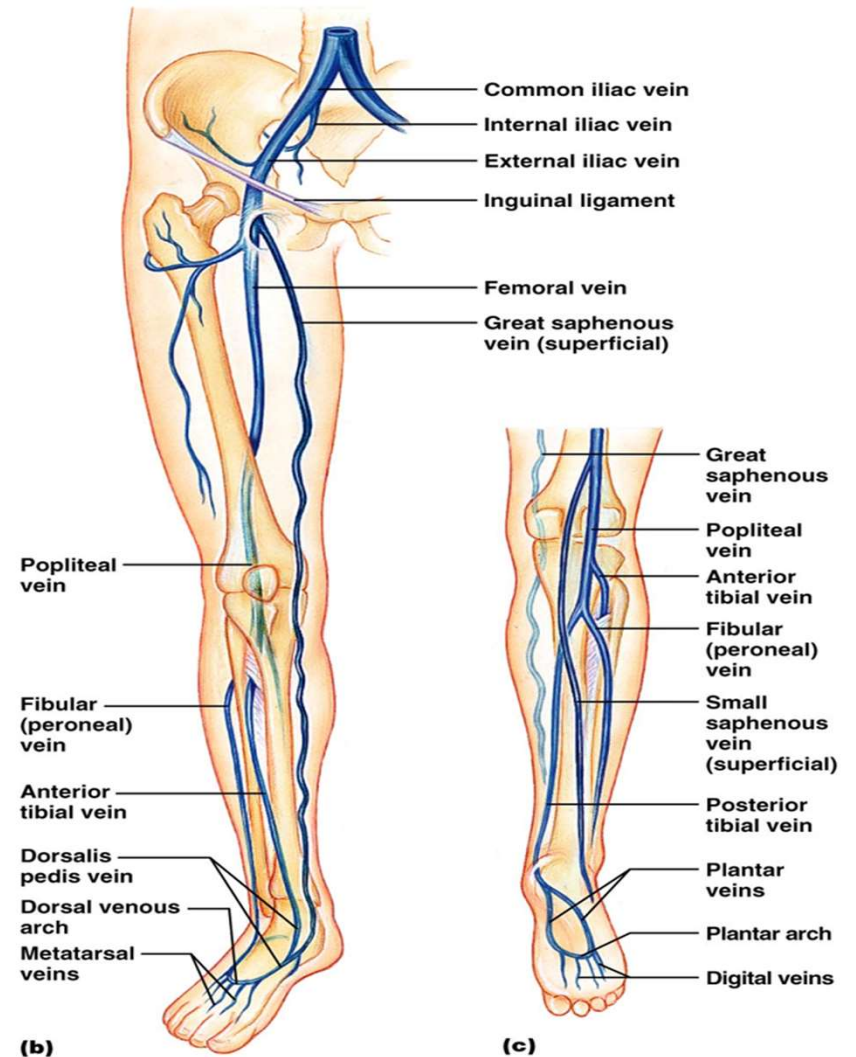
VEINS





(a)

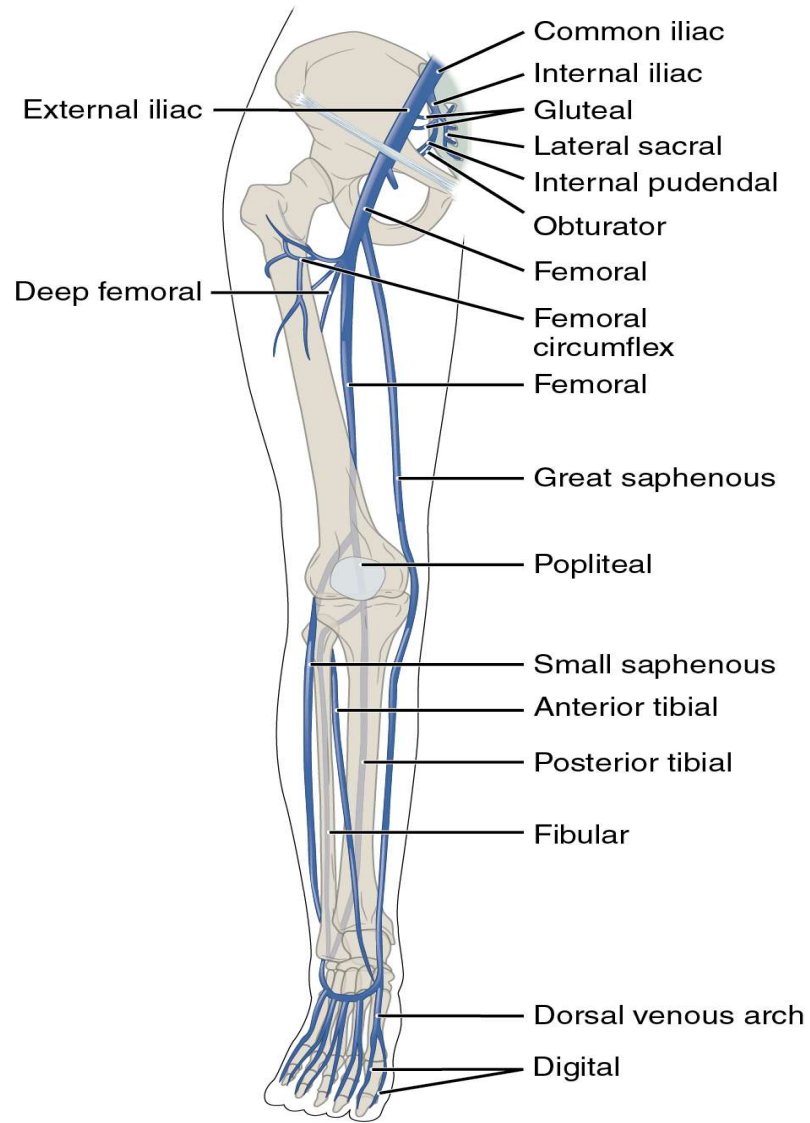
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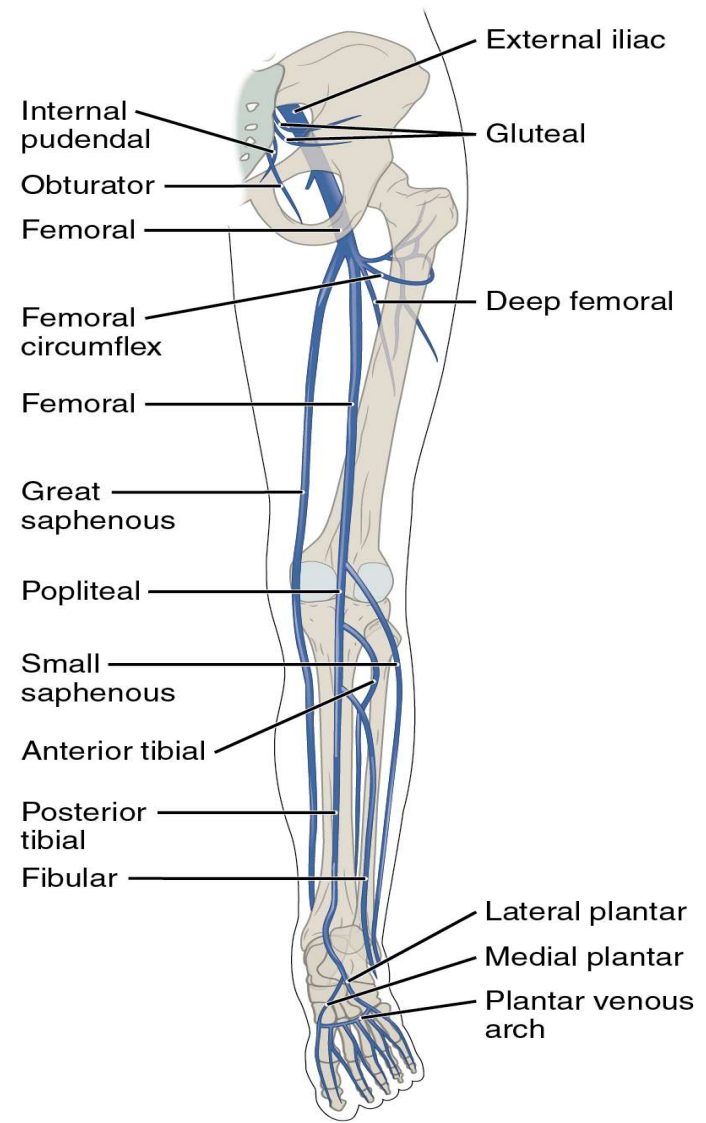
(b)

(c)

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Anterior view



Posterior view

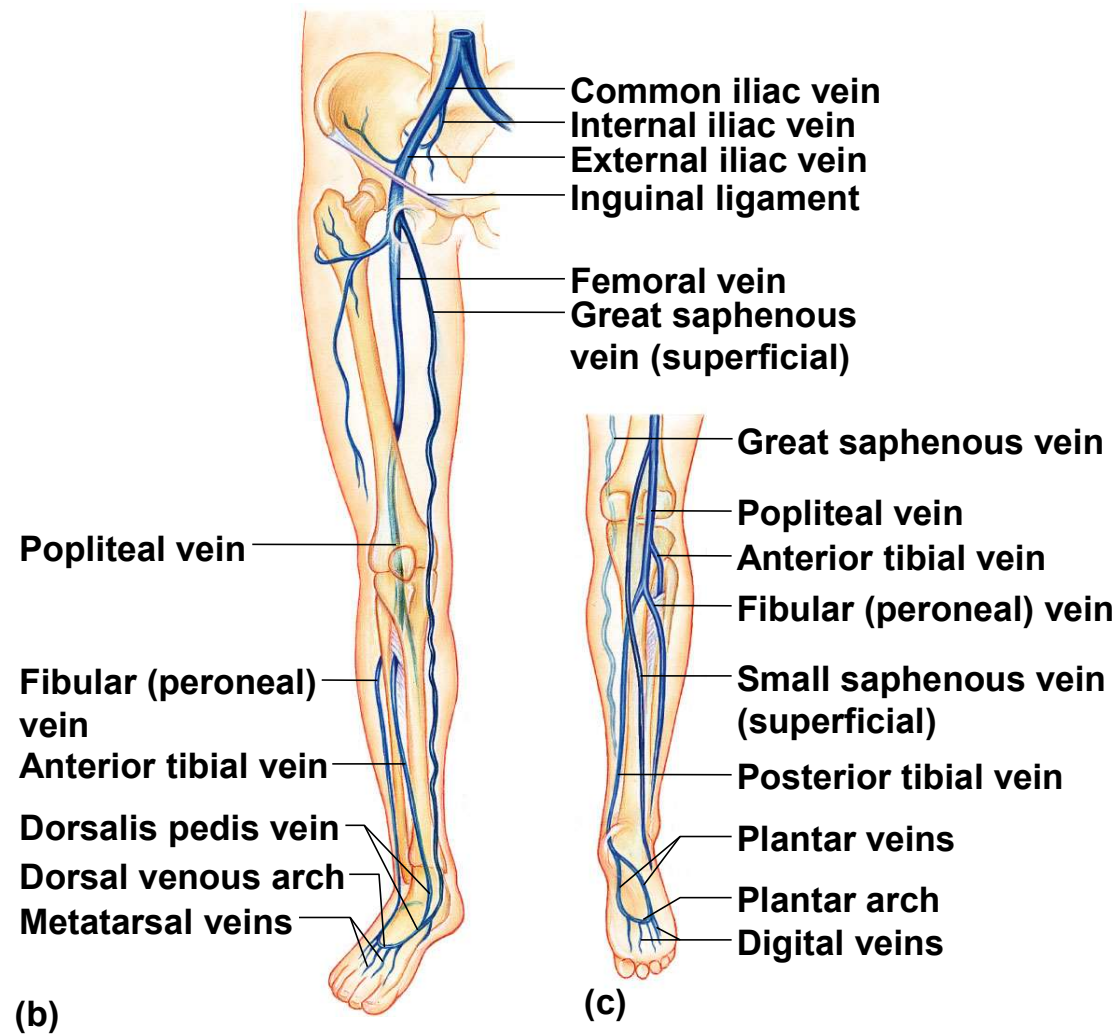


Figure 19.29b, c

1. The coronary arteries branch off of the _____.

- A. aortic valve
- B. ascending aorta
- C. aortic arch
- D. thoracic aorta

2. Which of the following statements is true?

- A. The left and right common carotid arteries both branch off of the brachiocephalic trunk.
- B. The brachial artery is the distal branch of the axillary artery.
- C. The radial and ulnar arteries join to form the palmar arch.
- D. All of the above are true.

3. Arteries serving the stomach, pancreas, and liver all branch from the _____.

- A. superior mesenteric artery
- B. inferior mesenteric artery
- C. celiac trunk
- D. splenic artery

4. The right and left brachiocephalic veins _____.

- A. drain blood from the right and left internal jugular veins
- B. drain blood from the right and left subclavian veins
- C. drain into the superior vena cava
- D. all of the above are true

5. The hepatic portal system delivers blood from the digestive organs to the _____.

- A. liver
- B. hypothalamus
- C. spleen
- D. left atrium

Answers for Review Questions

- A. B
- B. C
- C. C
- D. D
- E. A

Answers for Critical Thinking Questions

1. The right ventricle of the heart pumps oxygen-depleted blood to the pulmonary arteries.
2. The gonadal veins drain the testes in males and the ovaries in females.
3. The internal carotid arteries and the vertebral arteries provide most of the brain's blood supply.