

## Systemic Blood Vessels

For all vessels listed, you should be able to:

- **identify** the vessels on both the diagrams and models
- **distinguish** between right and left for vessels that are bilateral
- state the **major organ** that is supplied or drained by the vessels

### **Review of Pulmonary Circulation**

[\[Section 20.5.1: Pulmonary Circulation\]](#)

[\[Figure 20.23: Pulmonary Circuit\]](#)

[\[Table 20.4: Pulmonary Arteries and Veins\]](#)

### **The Aorta and Aortic Arch**

[\[Section 20.5.3: The Aorta; Section 20.5.3.2: Aortic Arch Branches\]](#)

[\[Figure 20.24: Systemic Arteries\]](#)

[\[Figure 20.25: Aorta\]](#)

[\[Figure 20.26: Arteries Supplying the Head and Neck\]](#)

[\[Figure 20.27: Arteries Serving the Brain\]](#)

[\[Table 20.5: Components of the Aorta\]](#)

aorta (sections):

ascending

aortic arch

descending (here called the “thoracic” aorta)

aorta (branches):

coronary arteries

brachiocephalic trunk

subclavian a.

common carotid a.

external carotid a.

internal carotid a.

vertebral a.

basilar a.

superficial temporal a.

facial a.

maxillary a.

### **Cerebral Arterial Circle (aka, the Circle of Willis)**

internal carotid a.

vertebral a.

basilar a.

anterior cerebral a.

middle cerebral a.

posterior cerebral a.  
anterior communicating a.  
posterior communicating a.

## **Thoracic and Abdominal Aorta**

[\[Section 20.5.3.3: Thoracic Aorta and Major Branches; Section 20.5.3.4: Abdominal Aorta and Major Branches\]](#)

[\[Figure 20.28: Arteries of the Thoracic and Abdominal Regions\]](#)

[\[Figure 20.29 Major Branches of the Aorta\]](#)

[\[Table 20.7: Arteries of the Thoracic Region\]](#)

[\[Table 20.8: Vessels of the Abdominal Aorta\]](#)

thoracic aorta  
intercostal aa.  
celiac trunk  
splenic a.  
common hepatic a.  
left gastric a.  
superior mesenteric a.  
renal a.  
gonadal a.  
inferior mesenteric a.  
common iliac a.  
internal iliac a.  
external iliac a.

## **Arteries Serving the Upper Limbs**

[\[Section 20.5.5: Arteries Serving the Upper Limbs\]](#)

[\[Figure 20.31: Major Arteries Serving\]](#)

[\[Figure 20.32: Major Arteries of the Upper Limb\]](#)

[\[Table 20.9: Arteries Serving the Upper Limbs\]](#)

axillary a.  
brachial a.  
radial a.  
ulnar a.  
digital aa.  
deep palmar arch  
superficial palmar arch

## **Arteries Serving the Lower Limbs**

[\[Section 20.5.6: Arteries Serving the Lower Limbs\]](#)

[\[Figure 20.33: Major Arteries Serving the Thorax and Upper Limb\]](#)

[\[Figure 20.34: Systemic Arteries of the Lower Limb\]](#)

[\[Table 20.10: Arteries Serving the Lower Limbs\]](#)

femoral a.  
deep femoral a.  
popliteal a.  
fibular a.  
plantar a.  
dorsalis pedis a.  
digital aa.

## **Superior Vena Cava and Veins of Head & Neck**

[\[Section 20.5.7.1: The Superior Vena Cava\]](#)

[\[Section 20.5.7.2: Veins of the Head and Neck\]](#)

[\[Section 20.5.7.3: Venous Drainage of the Brain\]](#)

[\[Figure 20.35: Major Systemic Veins of the body \]](#)

[\[Figure 20.36: Veins of the Thoracic and Abdominal Regions\]](#)

[\[Figure 20.37: Veins of the Head and Neck\]](#)

[\[Figure 20.39: Veins Flowing into the Superior Vena Cava\]](#)

internal jugular v.  
external jugular v.  
brachiocephalic v.  
subclavian v.  
superior vena cava

## **Veins Draining the Upper Limbs**

[\[Section 20.5.7.4: Veins Draining the Upper Limbs\]](#)

[\[Figure 20.38: Veins of the Upper Limb\]](#)

[\[Figure 20.39: Veins Flowing into the Superior Vena Cava\]](#)

subclavian v.  
cephalic v.  
axillary v.  
brachial v.  
basilic v.  
median cubital v.  
radial v.  
ulnar v.  
digital vv.

## **The Inferior Vena Cava**

[\[Section 20.5.7.5: The Inferior Vena Cava\]](#)

[\[Figure 20.40: Venous Flow into Inferior Vena Cava\]](#)

inferior vena cava hepatic v.  
renal veins common iliac  
v. internal iliac v. external  
iliac v. azygos v.  
hemiazygous v. renal  
veins common iliac v.  
internal iliac v. external  
iliac v. gonadal v.

## **Hepatic Portal System**

[\[Section 20.5.8: Hepatic Portal System\]](#) [\[Figure 20.43:](#)

[Hepatic Portal System\]](#)

hepatic v. hepatic portal  
v. splenic v.  
superior mesenteric v. inferior  
mesenteric v.

## **Veins Draining the Lower Limbs**

[\[Section 20.5.7.6: Veins Draining the Lower Limbs\]](#) [\[Figure 20.41:](#)

[Major Veins Serving the Lower Limbs\]](#) [\[Figure 20.42: Major Veins](#)  
[of the Lower Limb\]](#)

femoral v.  
great saphenous v. popliteal v.  
plantar venous arch dorsal  
venous arch digital vv.

## **Lab Exercise**

*Overview of Blood Vessels*

*Major Arteries and Veins of the Body*

*Systemic Vessels of the Axial Region*

*Pulmonary Circuit*

– see the Structures of Importance for the list of vessels that you should know

*Arteries of the Upper Limb*

*Veins of the Upper Limb*

*Arteries of the Lower Limb*

*Veins of the Lower Limb*

*Fetal Circulation*

– see the *Structures of Importance* for the list of vessels that you should know

**Learning Objectives**

- *To describe the microanatomy of blood vessel walls and the tissues that compose each, and to state the function of each layer*
- *To correlate differences in artery, vein and capillary structure with the functions of these vessels*
- *To recognize and differentiate an artery and a vein in cross-section on a slide, in a picture, on a diagram or on a model*
- *To list or identify the major arteries branching from the aorta, and indicate the body region supplied by each (see the below table)*
- *To list or identify the major veins draining to the superior or inferior vena cava, and the body region drained by each (see the below table)*
- *To compare and contrast pulmonary circulation from systemic circulation*
- *To describe “special” circulatory systems, including the fetal circulatory system, the hepatic portal system, and the circle of Willis, and identify features that are different from circulatory systems in the adult*

## Structures of Importance

<b>Microanatomy of arteries, veins, and capillaries</b>	
Tunica intima (or tunica interna)	
Tunica media	
Tunica externa	
Valves	
<b>Arteries of head and neck</b>	<b>Veins of the head, neck and brain</b>
Brachiocephalic trunk (artery)	Superior sagittal sinus
Subclavian artery	Internal jugular veins
Common carotid artery	Superficial temporal vein
External and internal carotid arteries	Facial vein
Facial artery	External and internal jugular veins
Superficial temporal artery	Brachiocephalic vein
Vertebral artery	Subclavian vein
	Superior vena cava
<b>Arteries of the upper limb and thorax</b>	<b>Veins of the upper limb and shoulder</b>
Brachiocephalic trunk (artery)	Radial vein
Subclavian artery	Ulnar vein
Axillary artery	Median antebrachial vein
Brachial artery	Median cubital vein
Radial artery	Basilic vein
Ulnar artery	Cephalic vein
Aortic arch	Brachial vein
Descending aorta	Axillary vein
	Subclavian veins
<b>Arteries of the abdomen</b>	Brachiocephalic veins
Celiac trunk	Superior vena cava
Splenic artery	Inferior vena cava
Common hepatic artery	Azygos vein
Left gastric artery	Hemiazygos vein
Hepatic artery proper	
Superior mesenteric artery	<b>Veins of the abdomen</b>
Inferior mesenteric artery	Hepatic veins
Renal arteries	Renal veins
Gonadal arteries (testicular or ovarian)	Left and right gonadal vein
Common iliac arteries	Common iliac vein
	External and internal iliac veins

<b>Arteries of the pelvis and lower limb</b>	<b>Veins of the lower limb</b>
External and internal iliac arteries	Dorsalis pedis vein
Femoral artery	Anterior tibial vein
Popliteal artery	Posterior tibial vein
Anterior tibial artery	Fibular or peroneal vein
Posterior tibial artery	Popliteal vein
Fibular artery	Femoral vein
Dorsalis pedis artery	Great saphenous vein
	External and internal iliac vein
	Common iliac vein

<b>Special Circulatory Systems</b>	
<b>Pulmonary circulation</b>	<b>Hepatic portal circulation</b>
Right and left atria	Hepatic portal vein
Right and left ventricles	Splenic vein
Pulmonary trunk	Inferior mesenteric vein
Right and left pulmonary arteries	Superior mesenteric vein
Pulmonary veins	Hepatic veins
<b>Fetal circulation</b>	<b>Circulation to the brain</b>
Superior and inferior vena cavae	Circle of Willis
Aorta, aortic arch and descending aorta	Internal carotid arteries
Pulmonary trunk, pulmonary arteries and veins	Anterior cerebral arteries
Hepatic portal vein	Anterior communicating artery
Umbilical arteries and veins	Posterior communicating artery
Ductus arteriosus	Posterior cerebral arteries
Ligamentum arteriosum	Basilar artery
Foramen ovale	Vertebral artery
Fossa ovalis	
Ductus venosus	
Ligamentum venosum	
Ligamentum teres	

**TABLE 1: Upper Extremities**

<b>Vessel</b>	<b>General Location</b>	<b>Distributes blood to/Receives blood from</b>	<b>Your Observations</b>
Aortic Arch			
Aorta			
Ascending aorta			
Aortic arch			
Coronary arteries			
Brachiocephalic trunk			
Right common carotid			
Right subclavian a			
Left common carotid a			



# CBIO 2210L - Systemic Circulation I

Left subclavian a			
Descending aorta			
<b>Thoracic aorta</b>			
Abdominal aorta			
Intercostal aa			
Upper Extremities			
Axillary a			
Brachial a			
Radial a			
Ulnar a			

# CBIO 2210L - Systemic Circulation I

Palmar arch aa			
Digital aa			
Digital vv			
Palmar arch vv			
Basilic v			
Cephalic v			
Median cubital v			
Radial v			
Ulnar v			
Brachial vv			

# CBIO 2210L - Systemic Circulation I

Basilic v			
Axillary v			
Cephalic v			
Subclavian v			
Brachiocephalic v			
Superior vena cava			
Head and Neck			
Vertebral aa			
External carotid a			
<b>Internal carotid a</b>			

# CBIO 2210L - Systemic Circulation I

Facial a			
Temporal a			
Maxillary a			
Occipital a			
Basilar a			
Internal jugular v			
External jugular v			
Vertebral v			
Papillary Muscles			

## CBIO 2210L - Systemic Circulation I

Trabeculae Carneae			
Pulmonary Semilunar Valve			
Bicuspid Valve			
Left Atrioventricular Valve (Mitral Valve)			
Aortic Semilunar Valve			

### REVIEW ANSWERS

1. Label the following illustration with the major arteries of the body. Try to complete the illustration first and then review the material in this exercise to determine your accuracy.
2. Blood from the left subclavian artery flows into what vessels as it moves toward the left arm?
3. Blood in the radial artery comes from what blood vessel?
4. An aneurysm is a weakened, expanded portion of an artery. Ruptured aneurysms can lead to rapid blood loss. Describe the significance of an aortic aneurysm versus a digital artery aneurysm.

## CBIO 2210L - Systemic Circulation I

5. The pulmonary arteries carry deoxygenated blood from the heart to the lungs. Umbilical arteries carry a mixture of oxygenated and deoxygenated blood. Why are these blood vessels called arteries?
6. What is the name of the outermost layer of a blood vessel?
7. What type of blood vessels has valves?
8. Blood from the common carotid artery next travels to what two vessels?
9. Blood from the right brachial artery travels to what two vessels?
10. Where does blood in the right subclavian artery come from?
11. The internal carotid artery takes blood to what organ?
12. From what blood vessel does the descending aorta get blood?
13. What is the general name of a large vessel that takes blood away from the heart?
14. The left common carotid artery receives blood from what vessel?

## CBIO 2210L - Systemic Circulation I

15. Name three blood vessels that exit from the aortic arch?

16. Working in pairs, have your lab partner select an artery for you to name. Quiz each other on the material learned in this exercise.  
To be done in lab.

17. Name all of the blood vessels that would carry a red blood cell from the left ventricle to the right thumb.

**TABLE 1: Lower Extremities**

<b>Vessel</b>	<b>General Location</b>	<b>Distributes blood to/Receives blood from</b>	<b>Your Observations</b>
Abdominal arteries			
Abdominal aorta			
Celiac artery			
Splenic a			
Left gastric a			
Common hepatic a			
Superior mesenteric a			
Intestinal a			
Ileocecal aa			



# CBIO 2210L - Systemic Circulation II

Right colic aa			
Middle colic aa			
<b>Suprarrenal aa</b>			
Renal aa			
Gonadal aa			
Inferior mesenteric a			
Common iliac aa			
External iliac aa			
Internal iliac aa			
Arteries of the Lower Extremities			

# CBIO 2210L - Systemic Circulation II

Femoral a			
Deep femoral a			
Posterior tibial a			
Fibular a			
Plantar aa			
Dorsal pedal a			
Digital aa			
Veins of the Lower Extremities			
Plantar venous arch			
Dorsal venous arch			

## CBIO 2210L - Systemic Circulation II

Anterior tibial v			
Great saphenous v			
Small saphenous v			
Posterior tibial v			
Popliteal v			
Femoral v			
External iliac v			
Veins of the Abdomen and Pelvis			
Internal iliac v			
<b>Common iliac v</b>			

# CBIO 2210L - Systemic Circulation II

Inferior vena cava			
Renal v			
Suprarenal v			
Lumbar v			
Right and left gonad vv			
Portal Circulation			
Inferior mesenteric v			
Gastroepiploic v			
Splenic v			
Hepatic portal v			

## CBIO 2210L - Systemic Circulation II

Hepatic v			
Thoracic Veins			
Intercostal vv			
Azygos v			
Hemiazygos v			

### REVIEW ANSWERS

1. Blood from the popliteal artery comes directly from what artery?
2. Blood from the celiac artery flows into three different blood vessels. What are these vessels?
3. The superior mesenteric artery takes blood to what major abdominal organs?
4. In what part of the arterial wall does cholesterol plaque develop?

## CBIO 2210L - Systemic Circulation II

5. How do the lower pelvic arteries in humans differ from those in cats?
6. Name the section of the descending aorta inferior to the diaphragm.
7. What artery takes blood directly to the femoral artery?
8. In humans, where does blood in the external iliac artery come from?
9. Blood in the inferior mesenteric artery travels to what organs?
10. What is arteriosclerosis?
11. Name the vessel that takes blood to the adrenal glands in the cat.
12. What vessels take blood to the kidneys?
13. The ovaries or testes receive blood from which arteries?
14. Label the following illustration using the terms provided.