THE CIRCULATORY PATHWAY

A. ARTERIES

Arteries are blood vessels that conduct blood away from the heart and toward tissues. In the pulmonary circulation, **pulmonary arteries** conduct deoxygenated blood to the lungs. In the systemic circulation, the **aorta** and its branches conduct oxygenated blood toward the systemic tissues. Small arteries are usually called **arterioles**. Arterioles conduct blood into a network of even smaller vessels, or **capillaries.** In charts/pictures, then in a model found in the lab, locate the major human arteries listed. As you do so, note how they form routes to major regions of the body.

■1 Find these portions of the aorta:

- ☐ **ascending aorta** – 1st portion, before the aorta bends inferiorly
- ☐ **aortic arch** – bend of the aorta, just superior to the heart
- ☐ **descending aorta** – the remainder of the aorta
- ☐ **thoracic aorta** – portion of the descending aorta that is above the diaphragm
- ☐ **abdominal aorta** – portion of the descending aorta below the diaphragm

■2 Locate these arteries of the head and neck:

- ☐ **brachiocephalic** – 1st branch off of the aortic arch
- ☐ **right common carotid -** medial branch of the brachiocephalic artery
  - ☐ **right internal carotid**
  - ☐ **right external carotid**
- ☐ **right subclavian -** lateral branch of the brachiocephalic artery
- ☐ **left common carotid** – 2nd branch off of the aortic arch
  - ☐ **left internal carotid**
  - ☐ **left external carotid**
- ☐ **left subclavian** – 3rd branch off of the aortic arch
- ☐ **right and left vertebrals** – branches of the subclavian
- ☐ **basilar** – artery formed by fusion of vertebral arteries
- ☐ **cerebral arterial circle (circle of Willis)** – circular system of arteries around the brain's base, formed by branches of the basilar artery and the internal carotids that includes the following:
  - ☐ **anterior communicating artery**
  - ☐ **anterior cerebral artery**
  - ☐ **middle cerebral artery**
  - ☐ **posterior communicating artery**
  - ☐ **posterior cerebral artery**

■3 Identify these arteries of the upper limb:

- ☐ **axillary artery** – continuation of the subclavian artery inferior to the clavicle
- ☐ **brachial** – continuation of the axillary artery in the upper arm
- ☐ **ulnar** – medial branch of the brachial artery
- ☐ **radial** – lateral branch of the brachial artery
- ☐ **deep palmer arch** – the ulnar and radial arteries unite in the hand

■4 Identify these branches of the descending aorta:

- ☐ **intercostal** – branches from the aorta to the intercostal muscles
- ☐ **phrenic** – branches from the aorta to the diaphragm
- ☐ **celiac** – anterior branch off of the aorta to:
  - ☐ the stomach (**left gastric**) – branch to the lesser curvature,
  - ☐ the spleen (**splenic**); and
    - ☐ the greater curvature of the stomach (**left gastroepiploic**)
    - ☐ the pancreas (**pancreatic**)
  - ☐ the liver (**hepatic**)
    - ☐ the stomach (**right gastric**) – branch to the lesser curvature
- ☐ **superior mesenteric** – anterior branch off of the abdominal aorta to the small intestine and proximal portion of the large intestine
- ☐ s**uprarenal (adrenal)** – lateral branches off of the abdominal aorta to the adrenal glands
- ☐ **renal** – lateral branches off of the abdominal aorta to the kidneys
- ☐ **gonadal** (**testicular, ovarian)** – lateral branches off of the abdominal aorta to the gonads
- ☐ **inferior mesenteric** – anterior branch off of the abdominal aorta to the distal portion of the large intestine
- ☐ **common iliac** – lateral branches from the inferior end of the abdominal aorta towards each leg

■5 Identify these arteries of the pelvis and lower limbs:

- ☐ **internal iliac** – medial branch of the common iliac
- ☐ **external iliac** – lateral branch of the common iliac
- ☐ **femoral** – continuation of the external iliac artery in the thigh
- ☐ **popliteal** – continuation of the femoral artery in the popliteal region
- ☐ **anterior tibial** – anterior branch of the popliteal artery that feeds the
  - ☐ **dorsalis pedis** – continuation of the anterior tibial
- ☐ **posterior tibial** – posterior branch of the popliteal artery
- ☐ **fibular (peroneal)** – lateral branch of posterior tibial

B. VEINS

Veins are blood vessels that conduct blood toward the heart. In the pulmonary circulation, the **pulmonary veins** return oxygenated blood from the lungs. In the systemic circulation, the **superior vena cava** returns deoxygenated blood from the head, neck, thorax, and arms. The **inferior vena cava** returns deoxygenated blood from the rest of the systemic loop. **Venules** are small veins. In charts/pictures, then in a model found in the lab, locate the major human veins listed. As with the arteries, note how they form routes from major body regions.

■1 Identify these veins of the head and neck:

- ☐ **right and left brachiocephalic** – branch into the superior vena cava
- ☐ **subclavian** – lateral branches into the right and left brachiocephalic
- ☐ **internal jugular** – medial branch into the brachiocephalic
- ☐ **vertebral** – intermediate branch into the brachiocephalic
- ☐ **external jugular** – external vein of the neck that returns blood to the subclavian

■2 Identify these veins of the upper limb:

- ☐ **axillary** – medial branch into the subclavian
- ☐ **basilic vein** – superficial vein that empties into the axillary
- ☐ **median antebrachial** – superficial vein that empties into the basilic
- ☐ **brachial** – upper arm vein that continues into the axillary regions as the axillary
- ☐ **cephalic** – lateral, superficial branch into the subclavian
  - ☐ **median cubital** – branch from the cephalic to the basilic

■3 Identify these veins of the thorax:

- ☐ **azygos** – unpaired branch into the posterior aspect of the superior vena cava
- ☐ **hemiazygos, accessory hemiazygos** – two sets of multiple veins that empty into the azygos
- ☐ **intercostal** – veins that empty into the azygos vein (right) and hemiazygos or accessory hemiazygos veins (left)

■4 Identify these tributaries of the inferior vena cava:

- ☐ **hepatic** – veins from the liver to the inferior vena cava
- ☐ **suprarenal** – on the right side the vein goes from the adrenal gland to the inferior vena cava, but on the left side the vein joins into the left renal vein which empties the blood into the inferior vena cava
- ☐ **renal** – veins from the kidney to the inferior vena cava

- ☐ **gonadal** (**testicular, ovarian)** – on the right side the vein goes from the gonad to the inferior vena cava, but on the left side the vein joins into the left renal vein which empties the blood into the inferior vena cava

- ☐ **common iliac** – two branches that fuse to become the inferior vena cava

■5 A **portal circulation** is a set of vessels that begins and ends with capillary networks. In other words, blood is returned to a second set of capillaries before being returned to the heart. The **hepatic portal system** is an important part of the venous systemic circulation. It returns blood from digestive organs to the liver, rather than directly to the heart. Identify these hepatic portal vessels:

- ☐ **hepatic portal** – from the veins of abdominal organs to the liver
- ☐ **superior mesenteric** – from the small intestine to the hepatic portal vein
- ☐ **inferior mesenteric** – from the large intestine, joining the splenic vein to the hepatic portal vein
- ☐ **splenic** – from the spleen, joining the inferior mesenteric to the hepatic portal vein
- ☐ **right and left gastroepiploic** – from the stomach, joining the superior mesenteric to the hepatic portal vein
- ☐ **gastric** – from the stomach, joining the hepatic portal vein

■6 Identify these veins of the lower limbs:

- ☐ **external iliac** – lateral branch into the common iliac vein (in the pelvis)
- ☐ **femoral** – major lateral branch into the external iliac vein
- ☐ **great saphenous** – major medial, superficial branch into the external iliac vein
- ☐ **popliteal** – posterior branch into the femoral vein, on the posterior of the knee
- ☐ **small saphenous** – lateral, superficial branch into the popliteal vein, lateral to the tibia
- ☐ **anterior tibial** – branch into the popliteal vein, on the anterior aspect of the tibia
- ☐ **posterior tibial** – posterior to the tibia, draining into the popliteal vein
- ☐ **fibular (peroneal)** – lateral branch into the posterior tibial vein
- ☐ **plantar venous arch** – network collecting blood from the foot which drains blood to the fibular, posterior tibial, and anterior tibial arteries.