

Blood Vessels of the Fetal Pig Dissection

Anterior Vessels Protocol:

1. To examine the blood vessels, you must first open the body cavity. Before you begin, get some string and tie one piece to the front leg. Run this string underneath the dissecting tray and then tie it to the other front leg. Do the same with a second piece of string for the back legs.

a. Begin by making two incisions through the skin of the abdomen so that one goes around each side of the umbilical cord and each extends down to the beginning of the legs. To avoid cutting too deeply, lift up on the umbilical cord to pull the skin away from the organs in the abdominal cavity.

b. Next, make a lateral incision at the base of the rib cage that cuts all the way through the skin and extends from the sternum all the way to the dorsal side of the body (ideally, this cut should be just below the diaphragm and follow it to the spinal column).

c. Finally, make an incision beginning at the papilla on the underside of the chin and extending down to the base of the sternum. You may wish to do this final cut in two stages because it is important that you cut the sternum directly down the middle. In the first step, cut through the skin of the thoracic cavity, but DO NOT cut into the sternum. Now peel the skin back away from the rib cage. This will allow you to see more clearly where the sternum is and what you need to cut. Now you are ready to cut through the sternum. Be careful that you do not cut too deeply and damage the heart or the blood vessels coming out of the heart. To avoid this, take your blunt probe and run it up underneath the sternum. You can then use your scalpel to cut down to the probe without damaging any important structures.

2. You may now put away your scalpel. The rest of what you need to do can be accomplished with the blunt probe or the tweezers. The first thing you will need to do is clean out the tissue on each side of the throat. The blood vessels you are looking for are deep in the body cavity here and so the overlying tissue must be removed. The majority of this tissue belongs to the **thymus**, which sits on each side of the throat and over the front of the heart. You will need to remove all of the thymus tissue.

3. You should remove all the tissue to the sides of the throat, but DO NOT remove the structures in the middle of the throat. These include structures of the respiratory system (the larynx and trachea) and the **thyroid** gland, which sits on top of the trachea, just above the heart.

4. After you have removed the thymus, there may still be considerable connective tissue around the blood vessels. Use your probes or the tweezers to clean off the vessels so that you can trace them from the heart out into the body.

5. Identify these veins that drain the anterior portion of the fetal pig:

a. The **superior vena cava** is the large vessel entering the heart from above. The **inferior vena cava** is the large blue vessel entering the heart from below.

b. Trace the superior vena cava out from the heart and identify the two short branches where it initially splits in two. These are the **left** and **right brachiocephalic** veins.

c. The brachiocephalic veins branch into 4 primary veins that extend up the throat into the head and out into the front legs. Closest to the center of the throat (i.e., the trachea) are the **left** and **right internal jugulars**, next to them are the **left** and **right external jugulars**. Outside the external jugulars are the **left** and **right cephalic** veins, which go to the front ball of each shoulder. Posterior to the cephalics are the **left** and **right subclavians**, which go into each front leg. Branching off the subclavians and going to each shoulder are the **subscapulars**.

d. Trace the external jugulars up to the point where they branch into the **facial** veins, running along the underside of each lower jaw, and the **maxillary** veins, running along the back of each jaw toward the ear.

e. The **right** and **left** internal **mammary** veins branch off the superior vena cava and run along the underside of the sternum.

f. The **costocervical** veins also branch off the superior vena cava and extend back toward the spinal column.

g. Note the **coronary** veins on the surface of the fetal pig heart.

h. Find the **intercostal** veins that drain the tissue along each rib.

i. The **hemiazygous** vein receives blood from the left intercostals and lies underneath the descending aorta next to the spinal column.

6. Identify these arteries that supply the anterior portion of the fetal pig:

a. Identify the **pulmonary** artery as it connects with the right ventricle (just as it did in the sheep heart).

b. The **aorta** lies immediately behind the pulmonary artery. The aorta is divided into different sections: the **dorsal** (or ascending) **aorta** is the small section where it leaves

the heart, the **aortic arch** is where it arches over the heart, and the **descending aorta** is that portion that goes down along the spinal column from the heart to the pelvis.

c. The first branch that comes off the aortic arch is the **brachiocephalic** artery. The brachiocephalic artery travels underneath the superior vena cava and branches into the **right subclavian**, which goes into the right front leg, and the **right and left carotids**, which supply the head.

d. The second branch off the aortic arch is the **left subclavian**, which supplies the left front leg.

e. Branching off the subclavians are the internal **mammary** arteries, which run parallel to the mammary veins and supply the tissue along each side of the sternum.

f. Note the **coronary** arteries on the surface of the heart. If you look closely, you should be able to see where the left and right coronary arteries branch off the dorsal aorta.

g. The **intercostal** arteries supply the tissue along each rib.

h. Trace the pulmonary artery from where it leaves the heart. Notice that one branch of the pulmonary artery connects it with the aorta. This is the **ductus arteriosus** (which will later become the ligamentum arteriosum). The other branch of the pulmonary artery goes to the lungs and branches to the left and right to take blood to each lung. This pathway only becomes functional after birth.