Name: _____ A & P Period: _____

DATE:	TITLE: Fetal Pig Dissection

LAB 6

QUESTION:

How does a pig's anatomy compare to a human's anatomy?

INTRODUCTION

In this activity, you will examine the outside of a beef kidney and then cut it open to see and identify the structures inside the kidney. To get full credit for this activity, your group will need to do 3 things:

1) Follow the instructions in this dissection guide to identify all the structures in the kidney.
2) After your group has identified all the structures in the kidney, your group should use your kidney to show me the path taken through the kidney by the blood, and by the filtrate that becomes the urine. As you explain this, you should point out and name all the structures that are involved.
3) Your group should answer the questions at the end of this lab guide

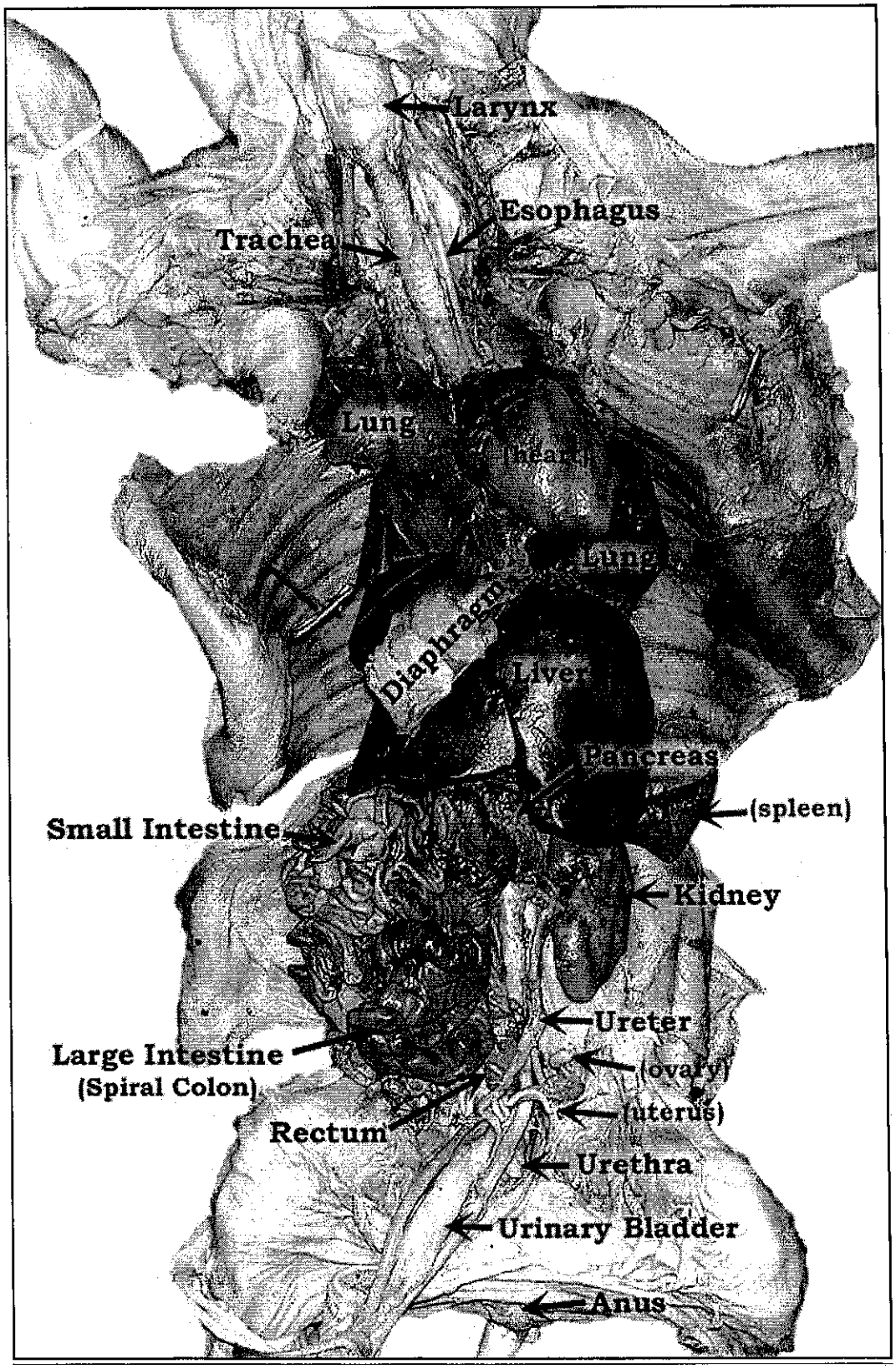
SAFETY GUIDELINES

- Safety goggles, gloves, and lab aprons should be worn when dissecting.
- Dissections should only be performed on the dissection tray to contain both the specimen and any excess fluids
- Handle sharp instruments with caution. Always point them and cut away from yourself and anyone else who is nearby.
- When you have finished, clean all your tools with detergent and put them away. *Wash your hands with detergent and warm water before leaving the lab.*

MATERIALS:

- A pig
- Storage bag
- Dissecting tray
- Dissecting instruments (scalpel, dissecting scissors, forceps, dissecting needle, probe, dissecting pins)
- Gloves
- Lab apron
- Safety goggle

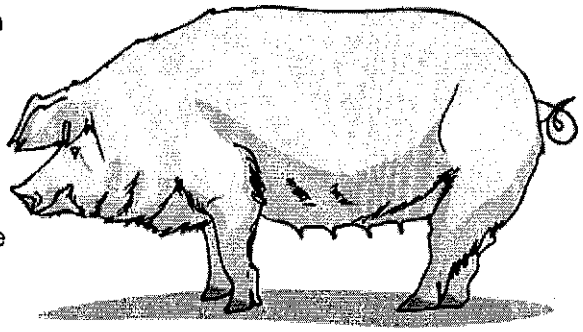
The Anatomy of the Fetal Pig



See the back of the dissection guide for a glossary of the anatomical terms:

External Anatomy

1. Determine the sex of your pig by looking for the **urogenital opening**. On females, this opening is located near the anus. On males, the opening is located near the **umbilical cord**.



If your pig is female, you should also note that **urogenital papilla** is present near the genital opening. Males do not have urogenital papilla.

Both males and females have rows of **nipples**, and the umbilical cord will be present in both.

What sex is your pig? _____

2. Make sure you are familiar with terms of reference: **anterior, posterior, dorsal, ventral.** In addition, you'll need to know the following terms

Medial: toward the midline or middle of the body
Lateral: toward the outside of the body
Proximal: close to a point of reference
Distal: farther from a point of reference

***label the sides on the pig picture above**

3. Open the pig's mouth and locate the **hard** and **soft palate** on the roof of the mouth. Can you feel your own hard and soft palates with your tongue?

Note the **taste buds** (also known as **sensory papillae**) on the side of the **tongue**. Locate the esophagus at the back of the mouth. Feel the edge of the mouth for teeth. Does the fetal pig have teeth? _____
Are humans born with teeth? _____

Locate the **epiglottis,** a cone-shaped structure at the back of the mouth, a flap of skin helps to close this opening when a pig swallows. The **pharynx** is the cavity in the back of the mouth – it is the junction for food (esophagus) and air (trachea).

4. Gestation for the fetal pig is 112-115 days. The length of the fetal pig can give you a rough estimate of its age.
11mm – 21 days
17 mm – 35 days
2.8 cm – 49 days
4 cm – 56 days
22 cm – 100 days
30 cm -- birth

How old is your fetal pig? _____

5. Observe the toes of the pig. How many toes are on the feet? _____
Do they have an odd or even number of toes? _____

6. Observe the eyes of the pig, carefully remove the eyelid so that you can view the eye underneath. Does it seem well developed? Do you think pigs are born with their eyes open or shut? _____

7. Carefully lay the pig on one side in your dissecting pan and cut away the skin from the side of the face and upper neck to expose the **masseter muscle** that works the jaw, **lymph nodes**, and **salivary glands**. The salivary glands kind of look like chewing gum, and are often lost if you cut too deeply.

****Make sure you know the locations of all the bold words on this handout****

See next page for visual image to guide you through this (S-1)

External Anatomy

1. Obtain a dissecting tray and a set of dissecting instruments.
2. Lay the fetal pig on its side in the dissection tray. Find the parts shown in Figure 1.

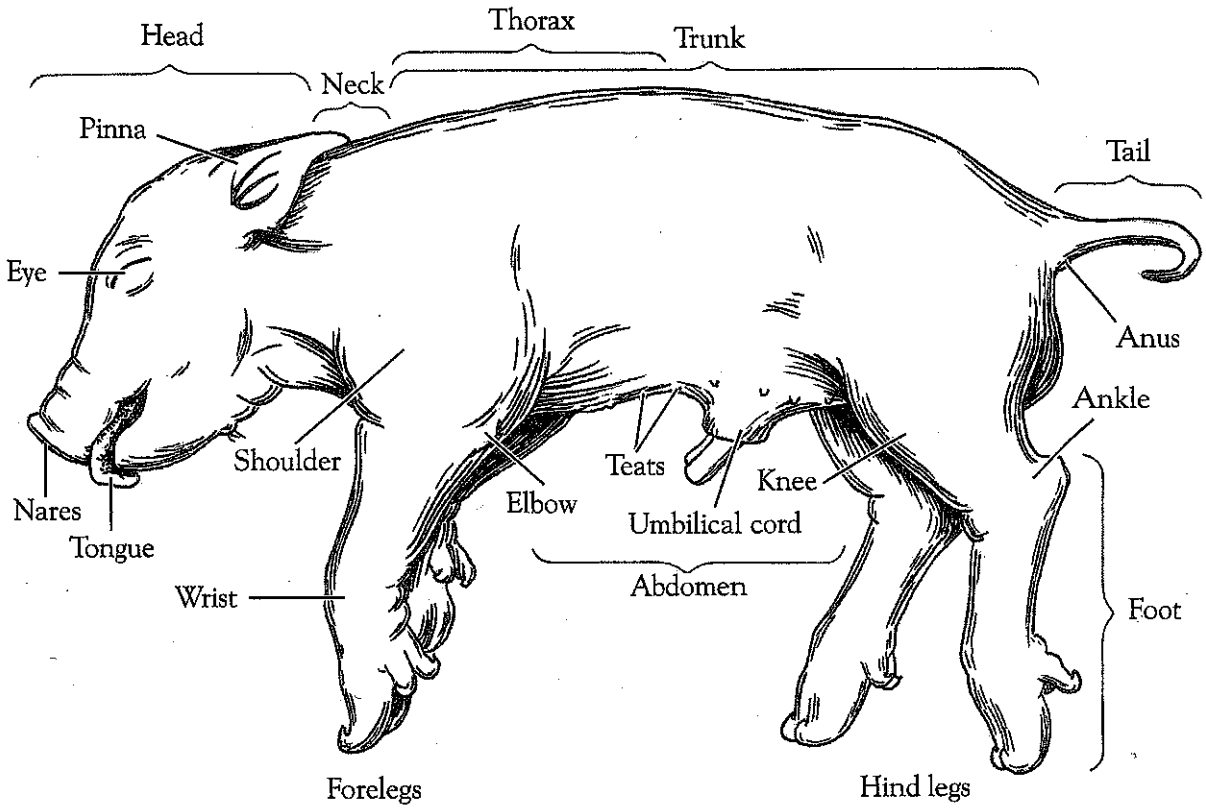


Figure 1

3. Determine the sex of your pig using Figure 2.

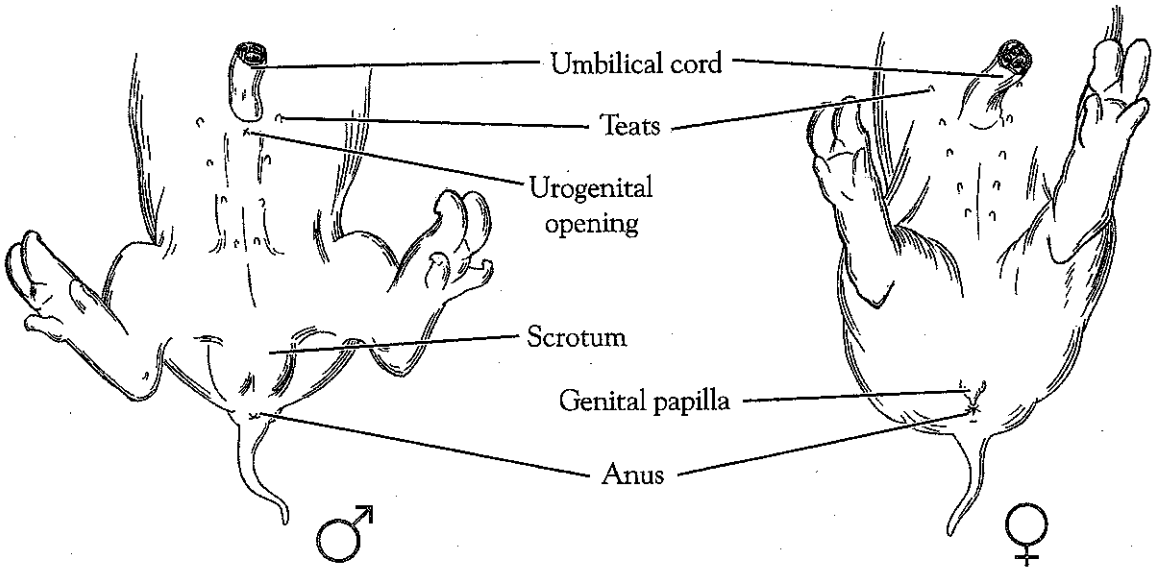
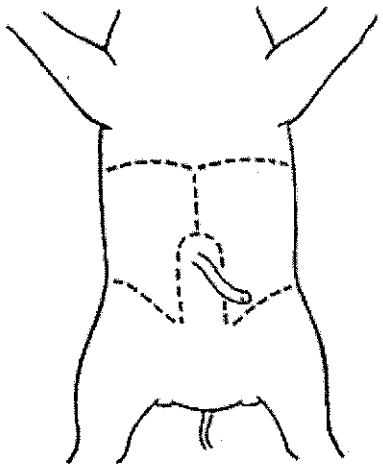


Figure 2

The Anatomy of the Fetal Pig

In this activity, you will open the abdominal and thoracic cavity of the fetal pig and identify structures. Remember, that to dissect means to "expose to view" - a careful dissection will make it easier for you to find the organs and structures. Be sure to follow all directions.



The Incision

Place your fetal pig in the dissecting pan ventral side up. Use string to "hog-tie" your pig so that the legs are spread eagle and not in your way. Use scissors to cut through the skin and muscles according to the diagram. Do not remove the umbilical cord. In the first section, you will only examine the abdominal cavity (the area below the ribcage).

After completing the cuts, locate the **umbilical vein** that leads from the umbilical cord to the liver. You will need to cut this vein in order to open up the abdominal cavity.

Your pig may be filled with water and preservative, drain over the sink if necessary and rinse organs. Locate each of the organs below, check the box.

1. **Diaphragm.** This muscle divides the thoracic and abdominal cavity and is located near the ribcage. The diaphragm aids in breathing. ☐

2. **Liver.** This structure is lobed and is the largest organ in the body. The liver is responsible for making bile for digestion. ☐

3. **Gall bladder**. This greenish organ is located underneath the liver; the **bile duct** attaches the gall bladder to the duodenum. The gall bladder stores bile and sends it to the duodenum, via the bile duct. ☐

4. **Stomach.** A pouch shaped organ that rests just underneath and to the pig's left. At the top of the stomach, you'll find the **esophagus**. The stomach is responsible for churching and breaking down food. ☐

5. At each end of the stomach are valves that regulate food entering and leaving the stomach. At the esophagus is the **cardiac sphincter valve**, and at the duodenum is the **pyloric sphincter valve**. View the inside of the stomach by slicing it open lengthwise. ☐

6. The stomach leads to the **small intestine**, which is composed of the **duodenum** (straight portion just after the stomach) and the **ileum** (curly part). ☐

7. The ileum is held together by **mesentery**. In the small intestine, further digestion occurs and nutrients are absorbed through the arteries in the mesentery. These arteries are called **mesenteric arteries**. ☐

8. **Pancreas**: a bumpy organ located along the underside of the stomach, a **pancreatic duct** leads to the duodenum. The pancreas makes insulin, which is necessary for the proper uptake of sugars from the blood. ☐

9. **Spleen**: a flattened organ that lies across the stomach and toward the extreme left side of the pig. The spleen stores blood and is not part of the digestive system. On the underside of the spleen, locate the **splenic artery**. ☐

10. At the end of the ileum, where it widens to become the large intestine, a "dead-end" branch is visible. This is the **cecum**. The cecum helps the pig digest plant material. ☐

11. The **large intestine** can be traced to the **rectum.** The rectum lies toward the back of the pig and will not be moveable. The rectum opens to the outside of the pig, or the **anus**. The large intestine reabsorbs water from the digested food, any undigested food is stored in the rectum as feces. ☐

12. Lying on either side of the spine are two bean shaped organs: the **kidneys**. The kidneys are responsible for removing harmful substances from the blood, these substances are excreted as urine. (more on this later) ☐

13. Two **umbilical vessels** can be seen in the umbilical cord, and the flattened **urinary bladder** lies between them. ☐

See next page for visual image to guide you through this (S-2 and S-3)

Digestive System

1. Tie string around the limbs on one side of the pig, bring the string under the tray to the opposite side, and, after positioning the pig with its ventral surface up, tie the string to the free limbs. If slipknots are used, the string can be tightened as needed.
2. With the pig securely positioned ventral side up, make the incisions indicated by the dotted lines in Figure 1. In the male, the penis lies under the skin posterior to the *urogenital orifice*. Two parallel incisions are extended past the *umbilical cord* to avoid cutting the penis. Make all incisions through the skin and underlying muscle and fat only.
3. Lay back the umbilical wall on each side and cut it away, exposing the abdominal organs as shown in Figure 2. If the abdominal cavity contains a lot of fluid, tilt the pig to one side and allow the fluid to run into the pan. Identify the organs shown in Figure 2.

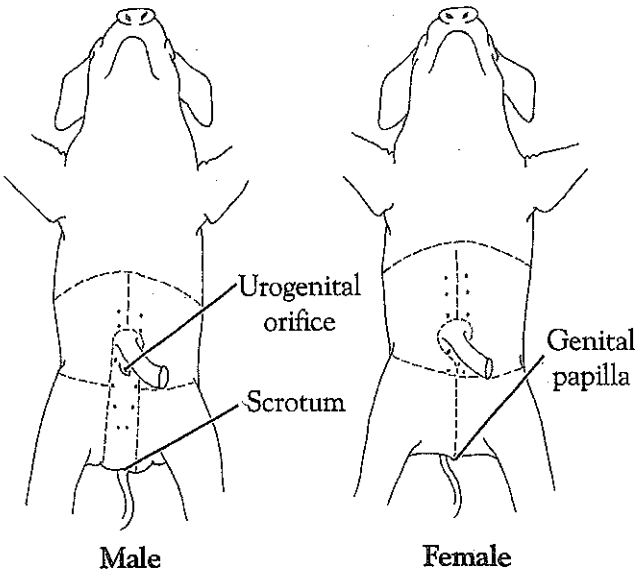


Figure 1

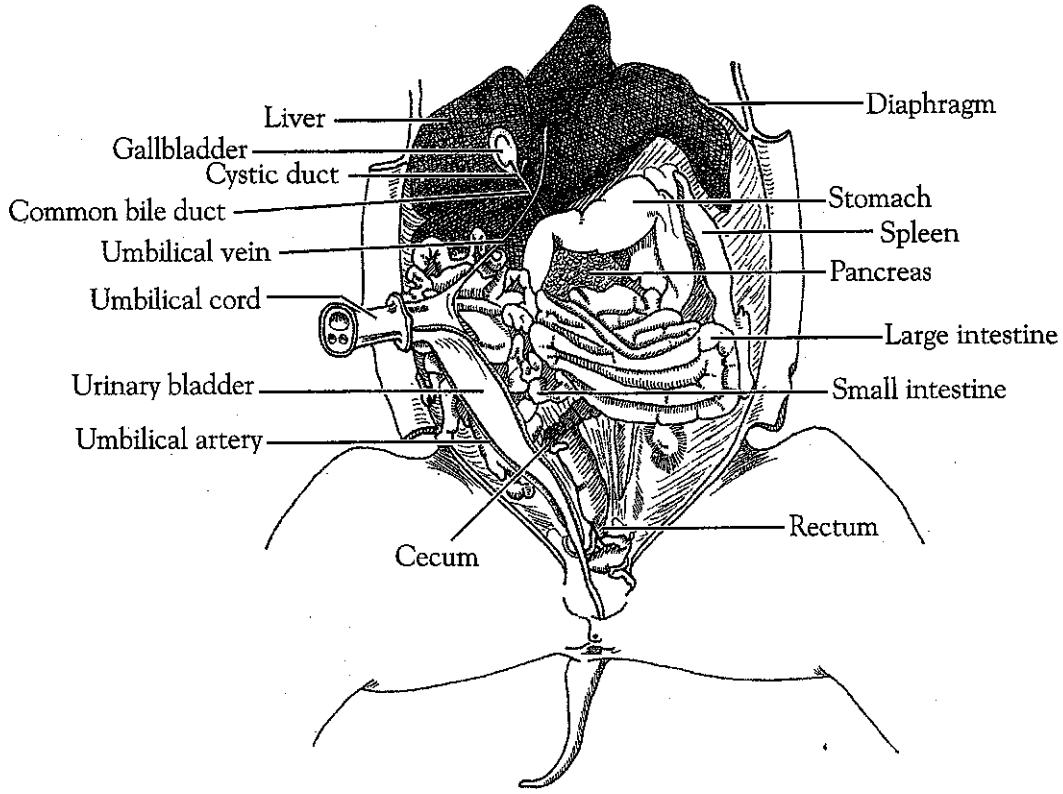
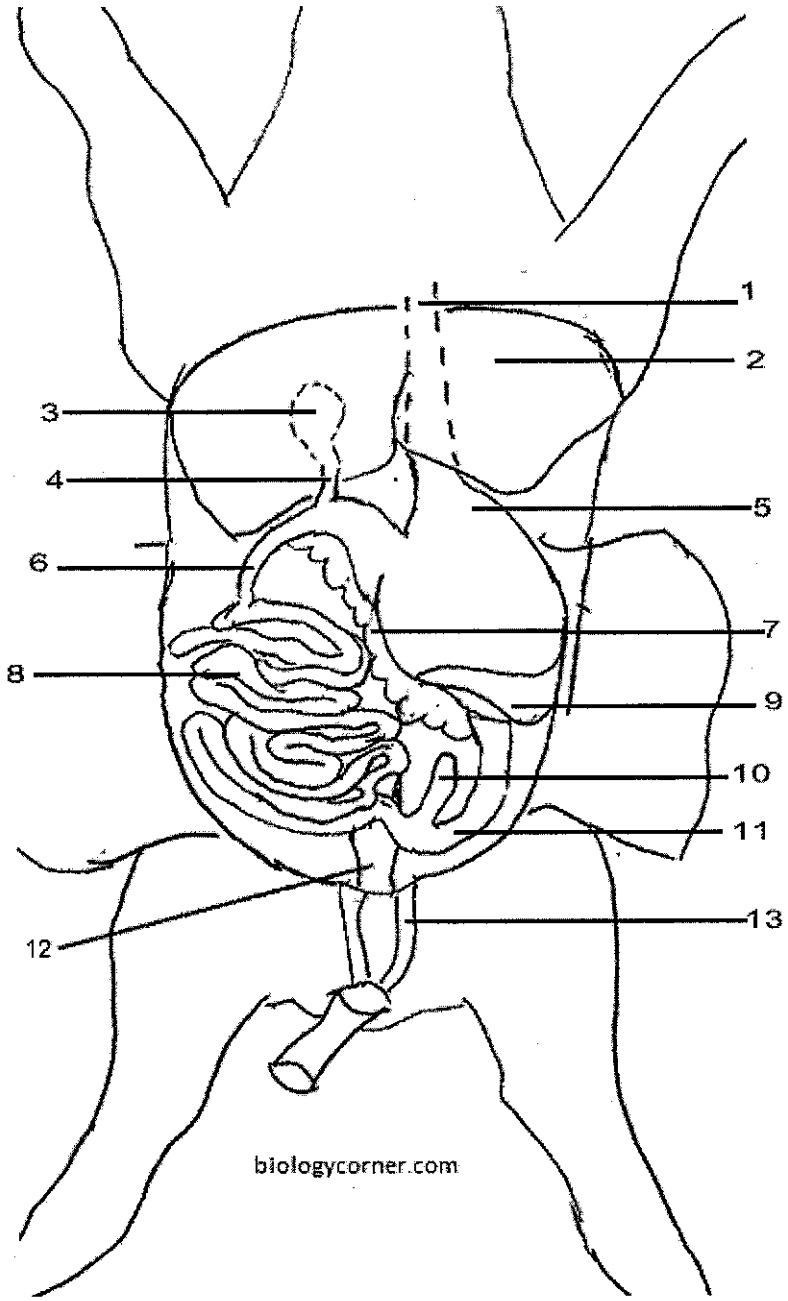


Figure 2

4. Cut the umbilical vein near the *liver* and lay the umbilical cord and urinary bladder back between the hind limbs. Lift the liver and locate the *gallbladder*, a sac attached to the liver's undersurface slightly to the right (left and right refer to the pig's left and right) side of the structure.
5. Coming from the gallbladder is the *cystic duct*. The cystic duct joins the *hepatic duct* from the liver to form the *common bile duct*. Find these ducts by removing the membranes that cover them.
6. Follow the common bile duct to its junction with the *duodenum*, the portion of the small intestine that attaches to the stomach. The large vein just dorsal to the common bile duct is the *hepatic vein*.
7. Lift the stomach and find the *pancreas* (which looks like ground fat) between the stomach and small intestine.
8. Lift the intestines and push them to the pig's right. Near the dorsal wall of the abdominal cavity find the *cecum*, a blind pocket of the large intestine at the junction of the two intestines.
9. Locate the *rectum*, the posterior end of the large intestine that attaches to the dorsal wall of the abdominal cavity and leads to the *anus*.
10. Try to locate the veins and arteries of the abdominal organs.



Identify the structures on the diagram.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____

Identify the organ (or structure)

14. _____ Opening (valve) between stomach and small intestine.
15. _____ Stores bile, lies underneath the liver.
16. _____ A branch of the large intestine, a dead end.
17. _____ Separates the thoracic and abdominal cavity; aids breathing.
18. _____ Membrane that holds the coils of the small intestine.
19. _____ The straight part of the small intestine just after the stomach.
20. _____ Empties bile into the duodenum from the gall bladder.
21. _____ The last stretch of the large intestine before it exits at the anus.
22. _____ Bumpy structure under the stomach; makes insulin
23. _____ Lies between the two umbilical vessels.

Urinary and Reproductive Systems

1. Locate the **kidneys**; the tubes leading from the kidneys that carry urine are the **ureters**. The ureters carry urine to the **urinary bladder** - located between the umbilical vessels.
2. Lift the bladder to locate the **urethra**, the tube that carries urine out of the body.
3. Note the vessels that attach to the kidney – these are the **renal vessels**

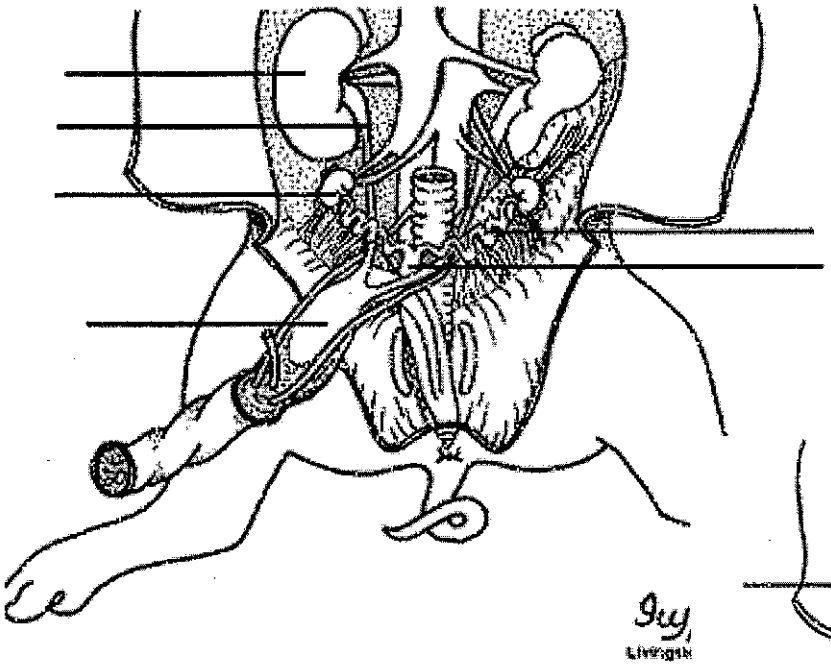
Male

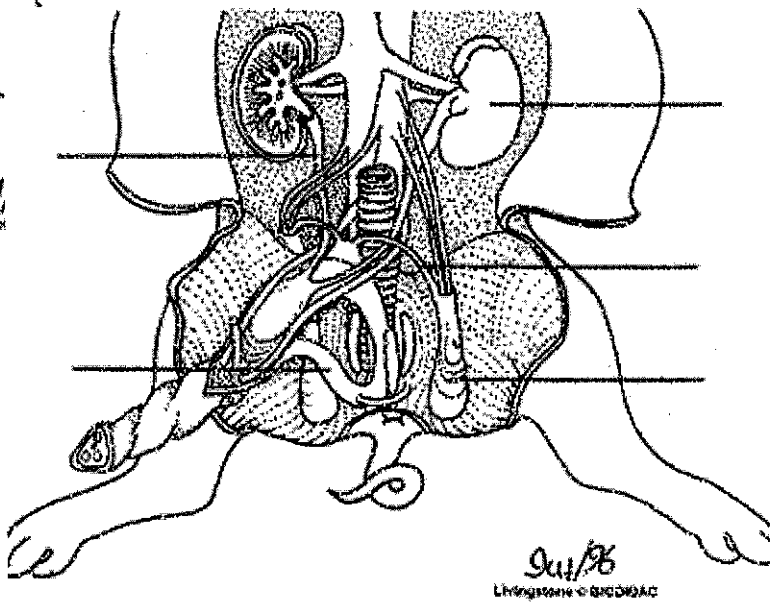
1. Find the **scrotal sacs** at the posterior end of the pig (between the legs), **testis** are located in each sac. Open the scrotal sac to locate the testis. ☐
2. On each teste, find the coiled **epididymis**. Sperm cells produces in the teste pass through the epididymis and into a tube called the **vas deferens** (in humans, a vasectomy involves cutting this tube). ☐
3. The **penis** can be located by cutting away the skin on the flap near the umbilical cord. This tube-like structure eventually exits out the urogenital opening, also known as the **urethra.** ☐

Female

4. In the female pig, locate two bean shaped **ovaries** located just posterior to the kidneys and connected to the curly oviducts. ☐
5. Trace the **oviducts** toward the posterior to find that they merge at the **uterus**. Trace the uterus to the **vagina**. The vagina will actually will appear as a continuation of the uterus. ☐

Label the diagrams (Identify the male and the female)





See next page for visual image to guide you through this (S-4 and S-5)

Urogenital System

1. Remove the digestive organs by cutting between the liver and diaphragm. Lift the liver and free its dorsal surface. Trim around the large vein (posterior vena cava), which runs through the dorsal part of the liver. Also remove the stomach and intestines. Cut through the rectum, and set the digestive organs aside.
2. Remove the membranes covering the kidneys and begin identifying the structures.
3. For the male reproductive system (Figure 1), trim away the skin from the *penis* and *urinary bladder*. Carefully dissect away the muscle and bone from the base of the penis, exposing the parts shown in Figure 1. The *testes* may be in the abdominal cavity just below the kidneys, or they may have descended through the *inguinal canal* into the *scrotum*.

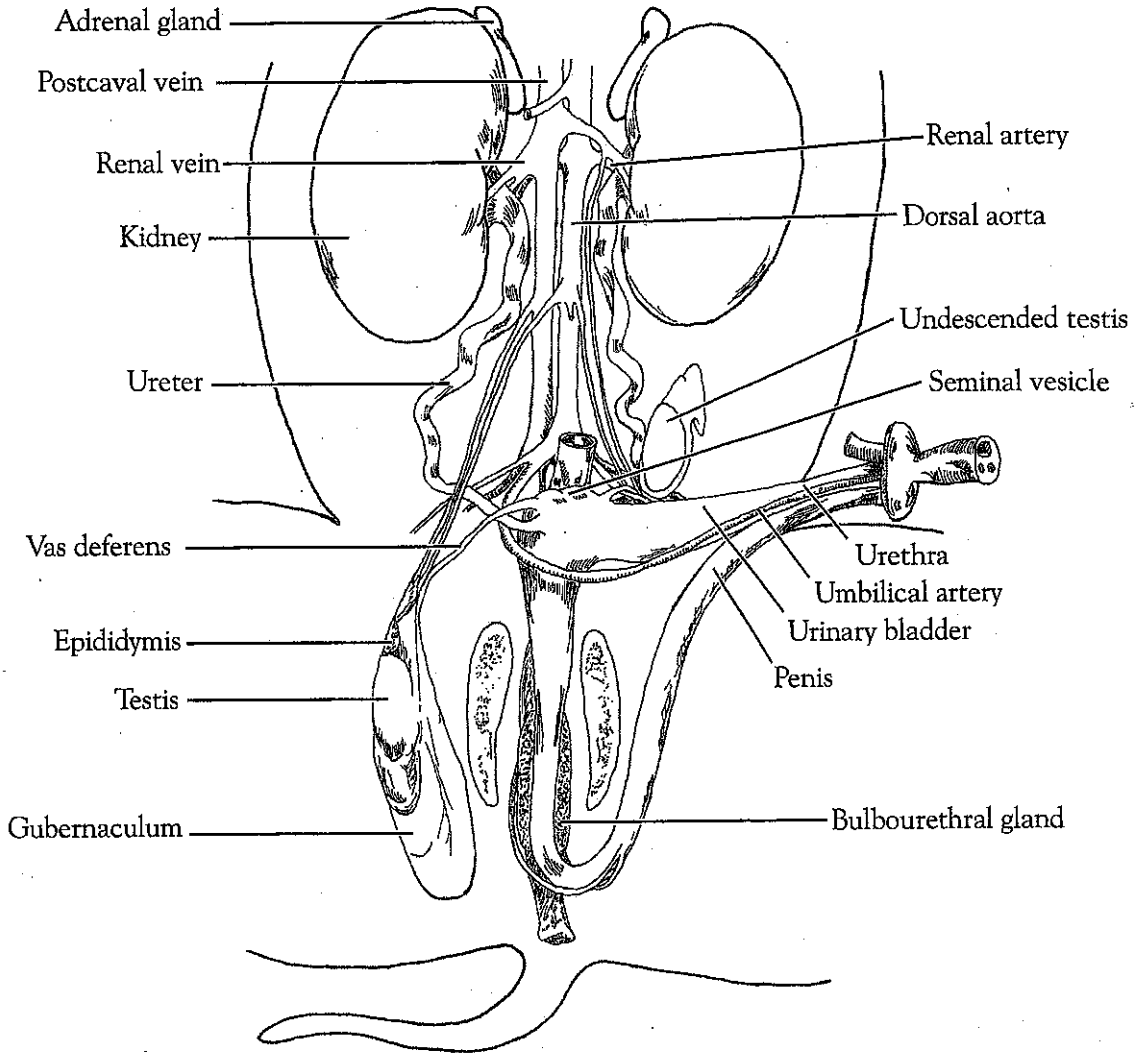


Figure 1

4. For the female reproductive system (Figure 2), locate the *ovaries* suspended below the kidneys. Trace the *fallopian tubes* (*oviducts*) from the ovaries to the urinary bladder. Push the bladder to one side and dissect away the muscle and bone to expose the parts shown in Figure 2.

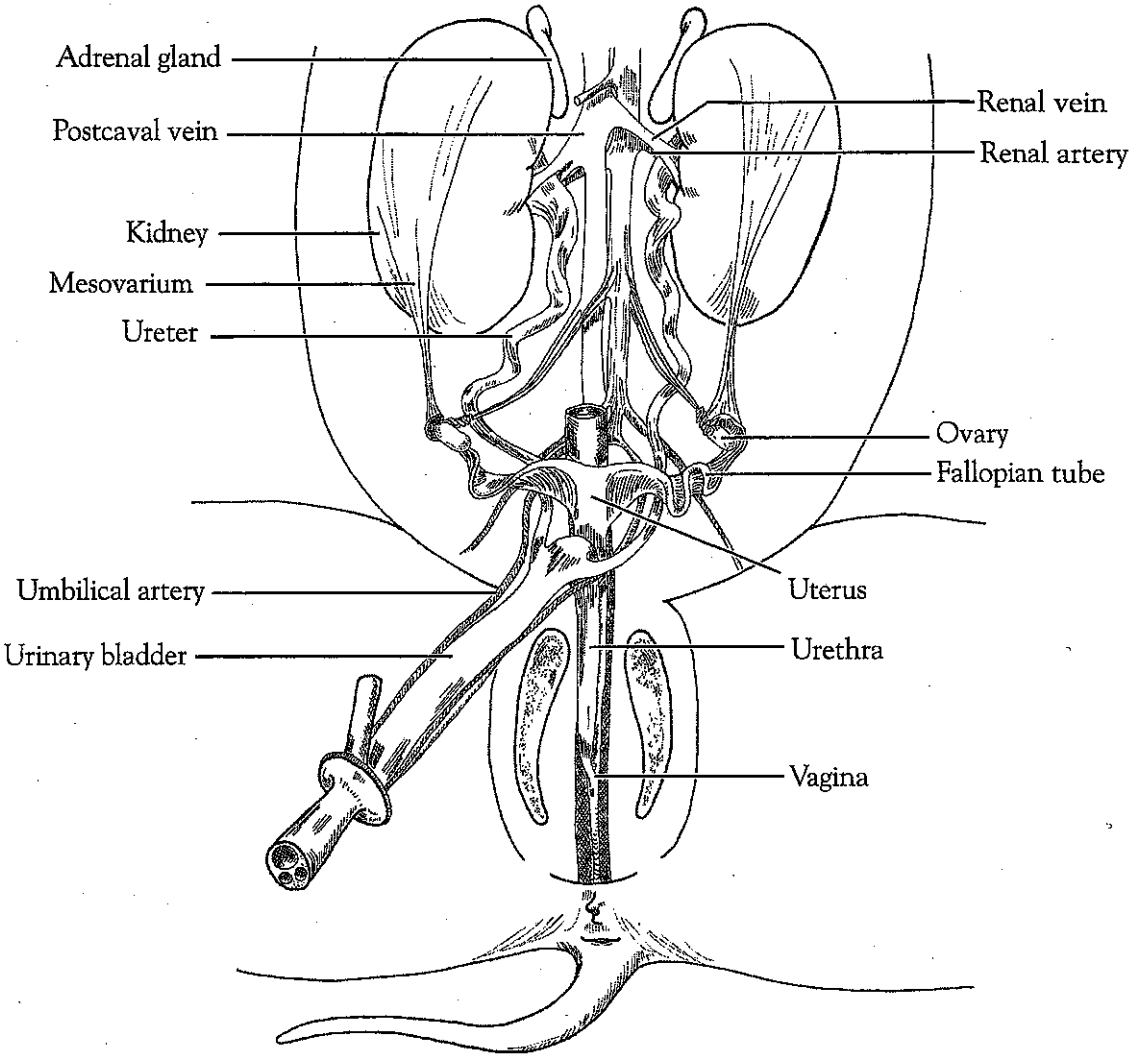


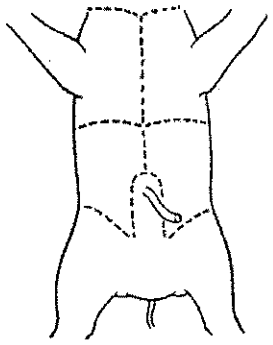
Figure 2

Dissection of the Thoracic Cavity

See next page for visual image to guide you through this (S-6 to S-8)

You may need to cut through the pig's sternum and expose the chest cavity (thoracic cavity) to view. You will need to cut all the way up into the pig's neck, almost to the chin and open the thoracic cavity.

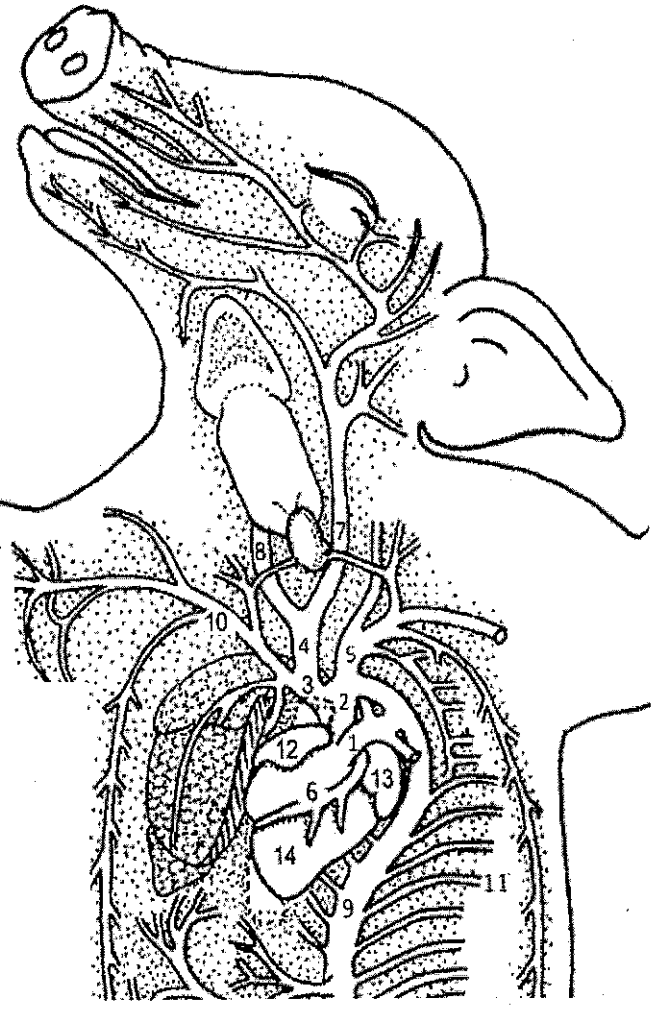
1. Find the **diaphragm** again. Remember that the diaphragm separates the abdominal cavity from the thoracic cavity and it aids in breathing. Above the diaphragm, center of chest, is the heart. ☐
2. Remove the **pericardium**, which is a thin membrane that surrounds the heart. ☐
3. The structures visible on the heart are the two **atria** (12,13), the **ventricle** (14) which has two chambers not visible from the outside. ☐



4. The most obvious vessel on the front of the heart is the **pulmonary trunk** (1) . ☐ It curves upward and joins the **aorta** (2) - a vessel which arches from the heart and curves around to go to the lower part of the body -where it is called the **abdominal (dorsal) aorta** (9). The aorta supplies the body with blood. ☐
5. The aorta will curve back and then branch in two spots – the right brachiocephalic (3) and the left subclavian (5) ☐
6. The right brachiocephalic then branches into arteries – the **common carotid** (4) and the **right subclavian** (10) The sublavians supply blood to the arms and follow the clavicle bone ☐
7. The **common carotid**, which will branch into the **left** (7) **and right carotid arteries** (8). The carotid arteries supply blood to the head and neck. ☐
7. Observe the **coronary vessels** (6) on the outside of the heart - these vessels supply blood to the muscle of the heart. ☐
8. Easy arteries to find are the ones that run near the ribs. These are the **intercostal arteries** (11). ☐
9. Lift the heart to look on its dorsal side (toward the back), you should be able to see the **anterior and posterior vena cava**, which brings blood from the body back to the heart. ☐ In addition, you should also be able to find the **left and right jugular veins** ☐ that drain blood from the head and run parallel to the carotids.
8. Push the heart to the side to locate two spongy **lungs** located to the left and right side. The lungs are connected to **bronchial tubes** (not visible) which connect to the **trachea** (forming a Y). ☐
9. The **trachea** is easy to identify due to the **cartilaginous rings**, which help keep it from collapsing as the animal inhales and exhales. The trachea should be located in the chin area above the heart. ☐
10. Lying atop the trachea, locate the pinkish-brown, V shaped structure called the **thyroid gland**. This gland secretes hormones that control growth and metabolism. ☐
11. At the anterior (toward head) of the trachea, you can find the hard light colored **larynx** (or voice box). The larynx allows the pig to produce sounds - grunts and oinks. ☐

Identify by number:

Aorta ____	Dorsal Aorta ____
Common carotid ____	Left & Right Carotid ____
Coronary vessels ____	Left Subclavian____
Right Subclavian ____	Right Brachiocephalic ____
Right Atrium ____	Left Atrium ____



Identify the structure.

1. _____ Membrane over the heart.
2. _____ Airway from mouth to lungs
3. _____ Blood supply to head
4. _____ Lower heart chambers
5. _____ Blood supply to lower body
6. _____ Muscle to aid breathing
7. _____ Returns blood to heart
8. _____ Large vessel at top of heart
9. _____ Used to make noises

Fetal Pig - Dissection of the Lower Arteries

See next page for visual image to guide you through this (S-6 to S-8)

1. Trace the abominal aorta (also called the dorsal aorta) to the lower part of the body, careful tweezing of the tissue will reveal several places where it branches, though some of the arteries may have been cut when you removed organs of the digestive system.

2. The hepatic artery leads to the liver. (may not be visible)
3. The splenic artery leads to the spleen (may not be visible)
4. The renal arteries lead to the kidney.

5. The mesenteric artery leads to the mesentery and branches into many smaller vessels. Look in the small intestine to find this artery.

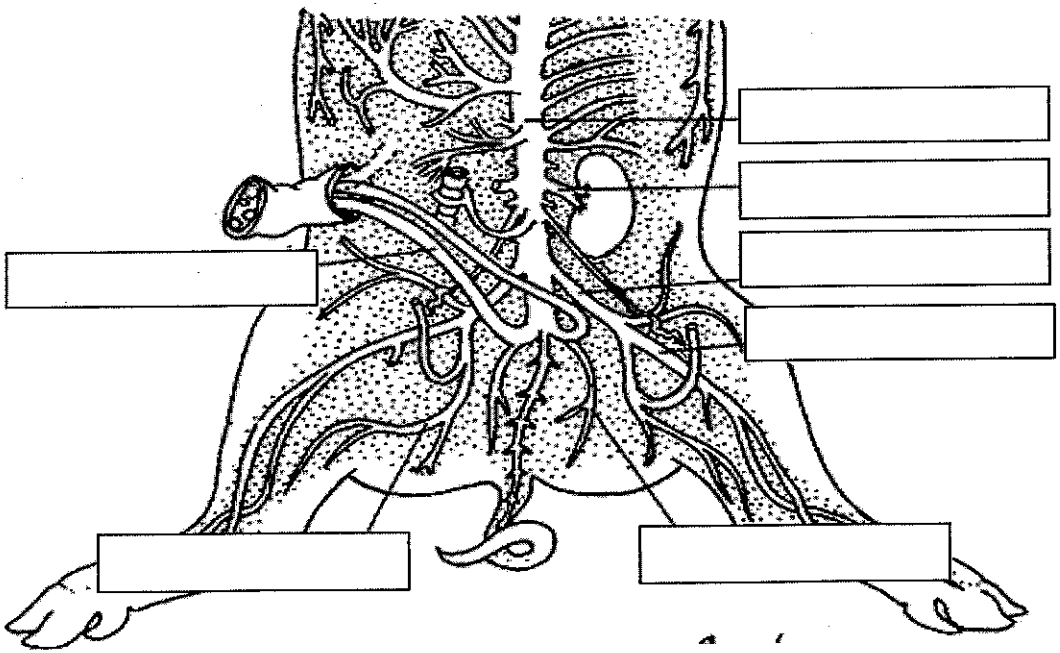
6. Trace the abominal aorta and note where it joins the umbilical arteries. You will need to cut the muscle in the leg to trace the next vessels. Use a pin to carefully tease away the surrounding muscle and tissue.

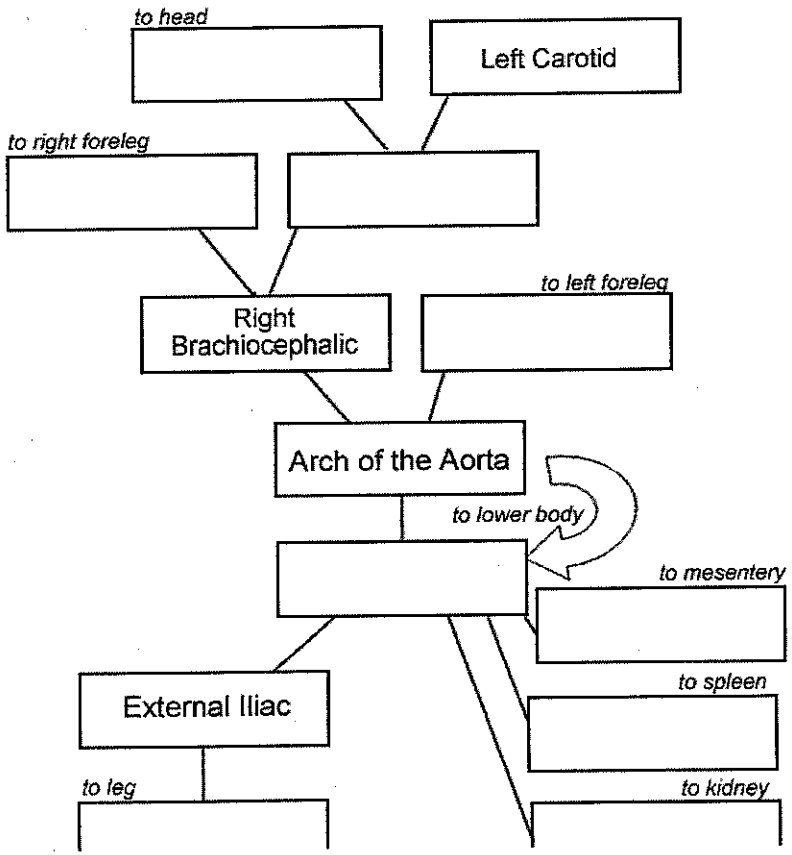
7. The abominal aorta splits into two large vessels that lead to each leg - the external iliac arteries will turn into the femoral arteries as they enter the leg

8. Follow the umbilical artery toward the pig, you'll find that it branches and a small artery stretches toward the posterior of the pig - this is the ilio-lumbar artery.

9. Follow the external iliac into the leg (carefully tease away muscle), it will branch into two arteries: the femoral (toward the outside of the leg) and the deep femoral (toward the back of the leg)

*** FILL OUT THE TWO DIAGRAMS**





Circulatory System

1. On the pig's throat, locate a prominent bump covered with hair. Make an incision from this bump along the mid-ventral line to open the abdominal cavity. Remove the fat and muscle of the throat to expose the structure shown in Figure 1. The halves of the *thymus gland* must be spread apart and the muscle below them removed to expose the *thyroid gland.*
2. Open the thoracic cavity by cutting through the *sternum* and cutting away the ribs as shown by the dotted lines on Figure 2.
3. Dissect away the *pericardium*, the membrane that surrounds the heart. Part of the thymus gland extends into the pericardium and must be removed.

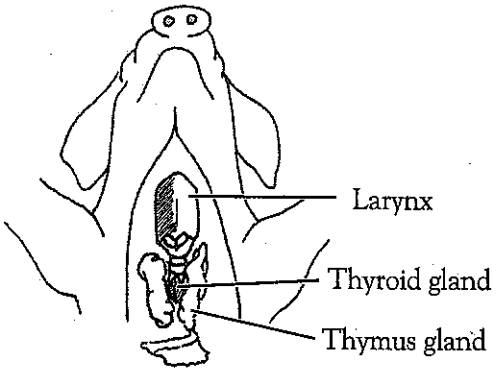


Figure 1

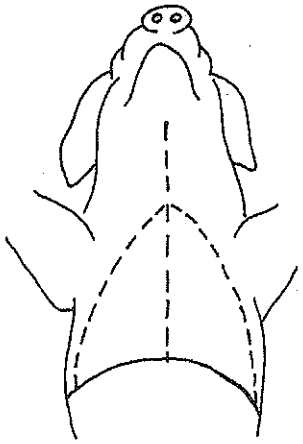


Figure 2

4. By carefully removing tissue, locate the veins (colored with blue latex) anterior to the heart, using Figure 3 on the next page. The anterior arteries (colored with red latex) are just dorsal to the anterior veins. After identifying the veins, remove them and identify the arteries.
5. The *pulmonary artery* to the lungs has a short expansion, the *ductus arteriosus*, which connects it to the *aortic arch*. This allows blood to bypass the lungs during fetal life. At birth the ductus arteriosus closes permanently, sending all the blood to the lungs for oxygen-carbon dioxide exchange.
6. Trace any posterior veins and arteries. Some of these have been cut, but find as many as possible. Remove any structures that are in your way.

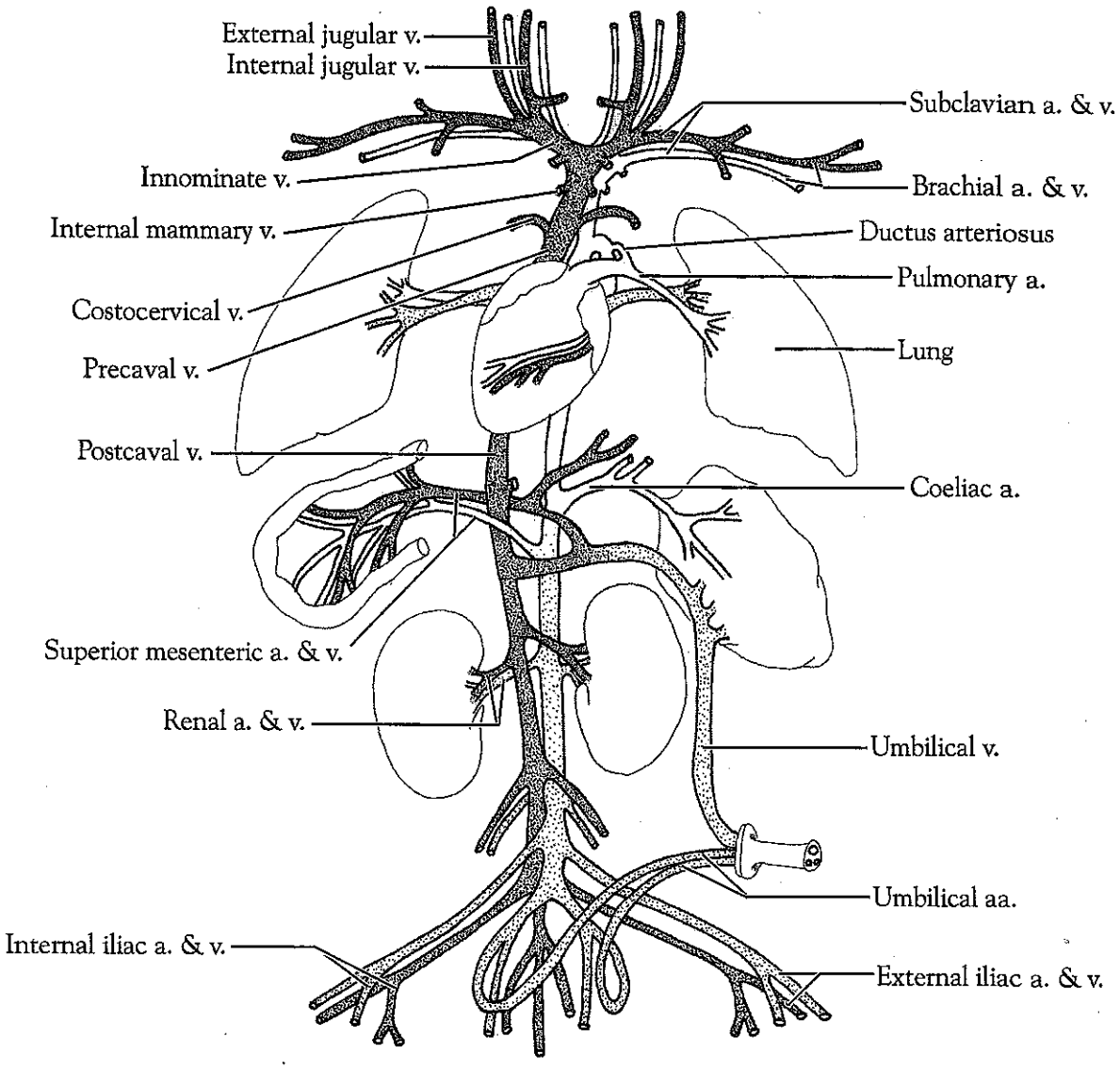


Figure 3

7. Begin removing the anterior blood vessels; leave stubs of the vessels attached to make identification possible later.
8. Locate the pulmonary vessels and carefully cut them where they enter the lungs. Try to minimize damage to the lungs.
9. Finally, cut the dorsal aorta and postcaval vein below the heart. Remove the heart and examine the parts of the respiratory system as shown in Figure 4 on the next page.

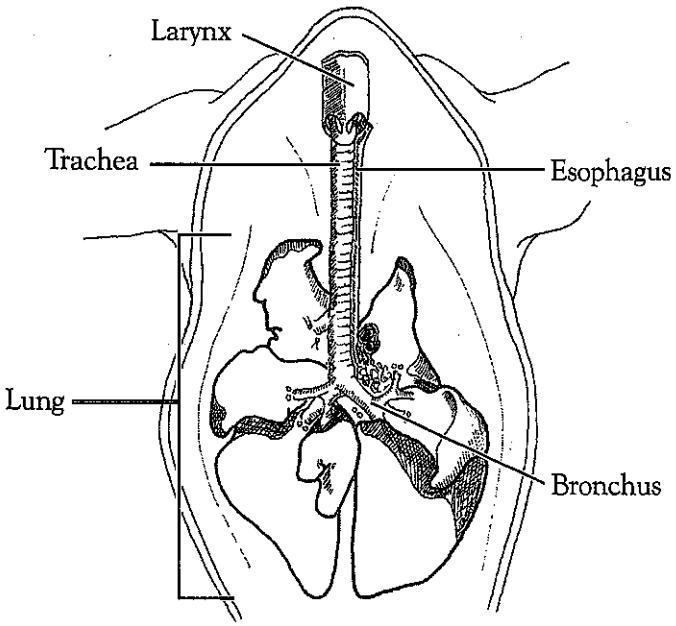


Figure 4

10. Turn the heart over and use Figure 5 to study its dorsal surface.
11. Make a section of the heart, cutting across both ventricles and opening the heart as shown in Figure 6.
12. It is necessary to make separate incisions to open the atria. Remove any latex filling the heart and identify the parts shown in Figure 5 and Figure 6.

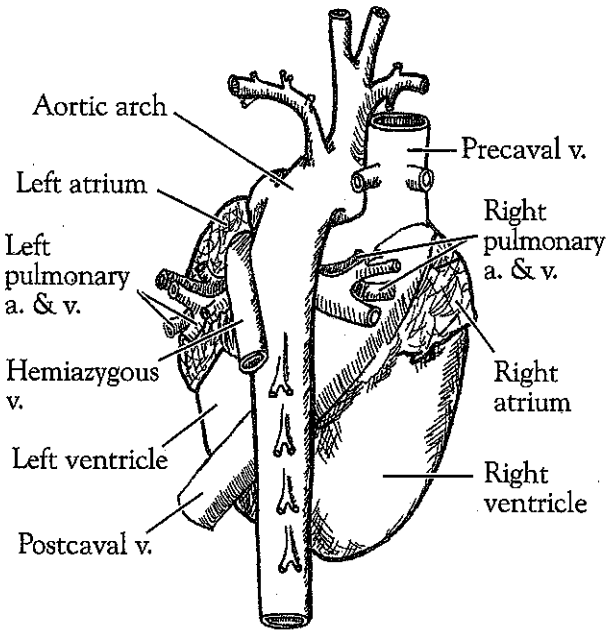


Figure 5

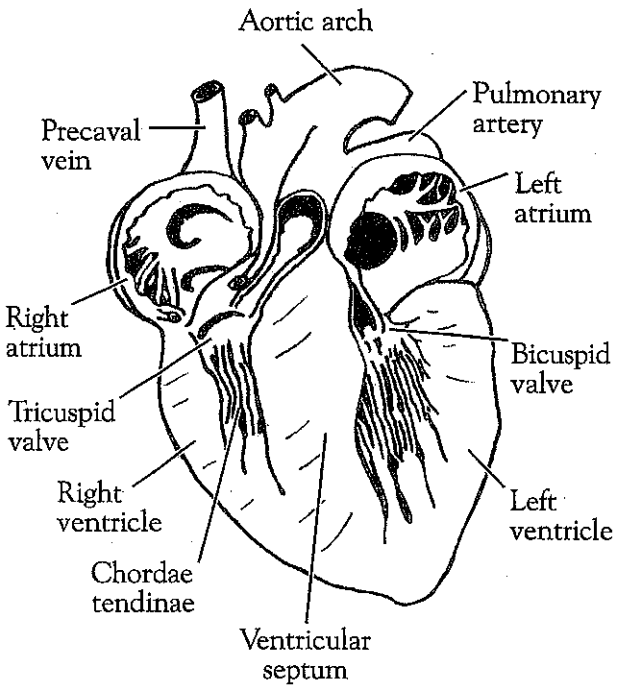


Figure 6

Nervous System

See next page for visual image to guide you through this (S-9)

Clean-up

1. When you have finished with the pig, I will give you some plastic to wrap it up. Clean all your equipment thoroughly with detergent and water and return it. Use paper towels, detergent, and water to clean up your work area. ***All group members are responsible for clean up.***

2. After your group has finished cleaning up, wash your hands well with detergent and water.

Nervous System

1. Place the pig dorsal surface up in the dissecting pan.
2. Remove the skin and muscle covering the brain and spinal cord by making incisions on each side and the top of the head, as shown in Figure 1 and Figure 2.

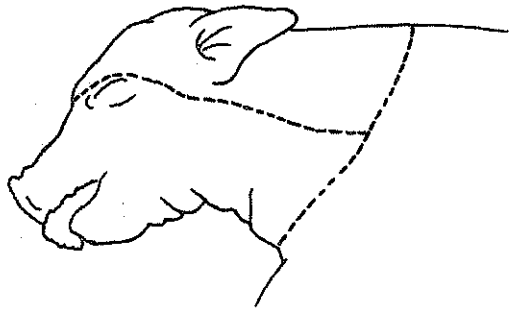


Figure 1

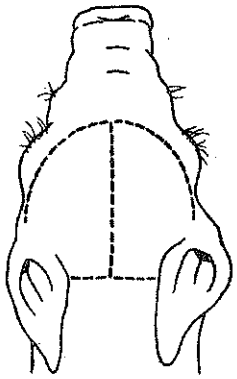


Figure 2

3. Cut through the skull bones at the top of the head; be careful not to damage the brain.
4. Use forceps to break away the skull bones.
5. Carefully remove the *dura mater*, the thickest, outermost layer of the *meninges*, the three-layered membrane that protects the brain and spinal cord.
6. Refer to Figure 3 to identify the parts of the brain.

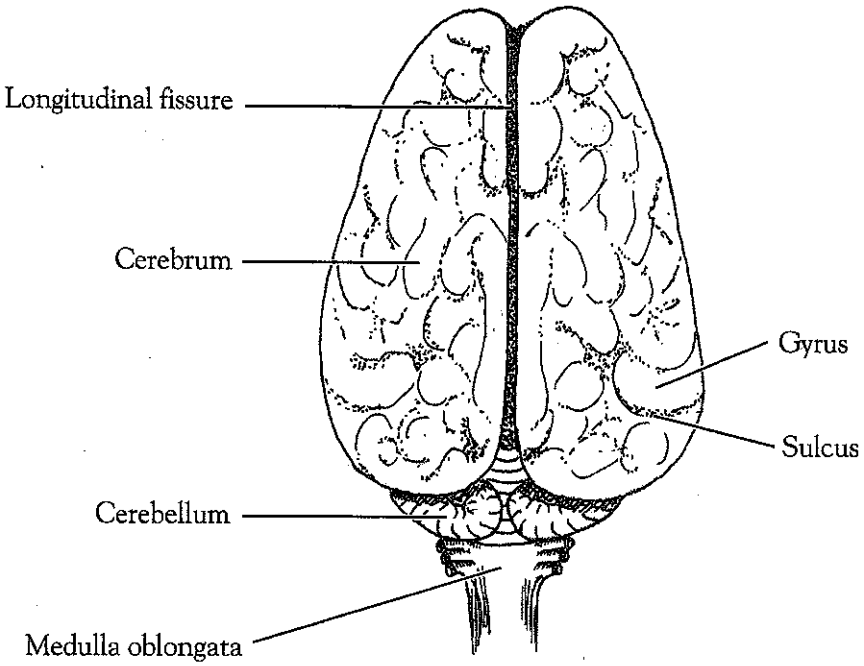


Figure 3

GROUP WORK REFLECTION:

Roles: (4 pts) Please put first AND last name!

1. Task Manager: _____
2. Spokesperson: _____
3. Data Collector: _____
4. Resource Manager _____

Checklist: (4 pts)

- ☐ Did each person play a part in the lab and on task?
- ☐ Did you follow safety rules?
- ☐ Were all parts of lab completed?
- ☐ Was group workspace cleaned up?

Answer the following questions: (10 pts)

What worked well the most during the assignment for the group?

What did not work so well during the assignment for the group? Where did you disagree as a group or saw mistakes in each other's work?

What will you do next time to improve how your group worked together?

How much did you as an individual participate in the group?

What can you do next time to improve your own performance in the lab group?

Group Rubric:

	Poor 1 point	Developing 2 points	Good 3 points	Excellent 4 points	Group Rating (YOU RATE)	Teacher Rating
Contribution	One or more members do not contribute.	All members contribute, but some contribute more than others.	All members contribute equally.	All members contribute equally, and some even contribute more than was required.		
Cooperation	Teacher intervention needed often to help group cooperate.	Members work well together some of the time. Some teacher intervention needed.	Members work well together most of the time.	All members work well together all of the time; assist others when needed.		
On task	Team needs frequent teacher reminders to get on task.	Team is on task some of the time. Needs teacher reminders.	Team is on task most of the time. Does not need any teacher reminders.	Team is on task all of the time. Does not need any teacher reminders.		
Communication	Members need frequent teacher intervention to listen to each other and speak to each other appropriately.	Members need some teacher intervention to be able to listen to each other and speak to each other appropriately.	All members listen to each other and speak to each other in equal amounts.	Each member listens well to other members. Each member speaks in friendly and encouraging tones.		
Total Score: /32					/16	/16

- **TOTAL SCORE ON REFLECTION: _____/50**
- **GROUP RATING: _____/32**
- **Completion of Lab: _____/50**
- **Overall Score on Lab: _____**

Glossary

Adrenal gland. One of a pair of endocrine glands, located above each kidney, that secretes steroid hormones and epinephrine.

Anterior. Toward the head (in quadrupeds).

Anus. The opening at the dorsal end of the rectum, through which wastes are eliminated from the body.

Aortic arch. Caudal turn of aorta as it originates at the dorsal end of the heart muscle and turns toward the posterior of the organism.

Bronchus (pl., bronchi). Air passageway in the lungs; the first branch off the trachea.

Bulbourethral gland. One of two small, round glands that produce preejaculate or Cowper's fluid in the male.

Cecum. The pouch of the large intestine at the junction of the large and small intestines.

Cerebellum. The second largest part of the brain; controls voluntary muscles and movement.

Cerebrum. The largest and most developed portion of the brain; consists of two hemispheres.

Common bile duct. Duct that carries bile from the gallbladder to the duodenum of the small intestine.

Cystic duct. Joins with the hepatic duct to form the common bile duct.

Diaphragm. A thin skeletal muscle that separates the thoracic and abdominal cavities; integral in the process of respiration.

Dorsal. Toward the back.

Ductus arteriosus. A blood vessel in the fetus that connects the pulmonary artery directly to the ascending aorta, in order to bypass the lungs.

Duodenum. The first section of the small intestine.

Dura mater. The thickest, outermost layer of the meninges.

Epididymis. Long, coiled tube that connects the testis to the vas deferens.

Esophagus. Muscular tube that connects the pharynx to the stomach.

Fallopian tube. Oviduct; one of a pair of tubes that carry ova (eggs) from the ovaries to the uterus.

Gallbladder. A small, green sac beneath the right lobe of the liver, in which bile is stored.

Genital papilla. In female pigs, an extension of gonad tissue on the body's external surface.

Gubernaculum (pl., gubernacula). Either of a pair of tissue strands that causes the descent of the testes through the inguinal canal as the scrotum forms in the fetus.

Hepatic duct. The main duct of the liver; bile travels from the liver to the gallbladder through this duct.

Hepatic vein. Vein that drains blood from the liver.

Inguinal canal. Either of a pair of openings that connects the abdominal cavity with the scrotum in the fetus.

Larynx. Located between the pharynx and the trachea, commonly called the "voice box."

Liver. Organ responsible for tasks such as bile production, glycogen storage, and blood plasma protein synthesis.

Mammary gland. Milk producing gland of the female; the presence of mammary glands is an identifying characteristic of mammals.

Medulla oblongata. The part of the brain stem that links the brain and the spinal cord; controls autonomic functions such as respiration and heartbeat.

Meninges (sing., meninx). Collectively, the three layers of connective tissue membrane that protect the brain and spinal cord; the dura mater, arachnoid, and pia mater.

Mesovarium. The mesentery, or protective membrane, of the ovaries.

Ovary. Female reproductive organ; produces ova (egg cells).

Oviduct. Fallopian tube.

Pancreas. Gland that lies behind the stomach; produces insulin and glucagon and secretes the hormones into the bloodstream.

Penis. External male reproductive organ through which semen and urine are discharged from the body.

Pericardium. The protective membrane that surrounds the heart.

Posterior. Toward the tail.

Posterior vena cava. Large vein that receives blood from the parts of the body below the diaphragm to return to the heart.

Pulmonary artery. Artery that moves blood from the heart to the lungs to receive oxygen.

Rectum. The terminal portion of the large intestine.

Scrotum. The sac that holds the testes and epididymides outside of the male body.

Spleen. An organ that filters and stores blood; source of red blood cells in the fetus.

Sternum. The breastbone.

Testis (pl., testes). One of the pair of male sex organs that produces sperm; forms within the abdomen and later descends into the scrotum during the fetal stage.

Thymus gland. An endocrine gland located on the ventral surface of the cervical region of the pig, lateral to the trachea, all of the way to the lungs. This gland is responsible for growth and development, sexual maturation, and immunity. After a mammal reaches sexual maturity, the thymus gland shrinks to a much smaller size.

Thyroid gland. An endocrine gland located on the ventral trachea that secretes hormones that act on every cell in the body. This gland is responsible for monitoring metabolism, growth rate, and calcium levels in the organism. These hormones are required for the development of the skeleton, muscles, and sex organs.

Trachea. Located between the larynx and the bronchi; commonly called "the windpipe."

Umbilical cord. The tissue that connects the fetus to the placenta; contains two arteries and one vein.

Ureter. One of a pair of tubes connecting the kidney to the urinary bladder.

Urethra. Tube that travels from the urinary bladder to the external orifice of the body; urine is excreted from the body through the urethra.

Urinary bladder. Muscular organ that serves as storage for urine that will later be excreted from the body.

Urogenital orifice. The opening where waste products and/or reproductive fluids leave the body.

Uterus. In pigs, contains two large uterine horns and a small uterine body. Development of fetuses occurs in the uterine horns.

Vagina. The lower part of the female reproductive tract; connects the cervix to the outside of the body.

Vas deferens. Series of tubes that carry sperm from the testis to the urethra; also called ductus deferens.

Ventral. Toward the belly.