**Mink Dissection Lab**

**Purpose:** This lab dissection is designed to give you first-hand experience with the organs (or their mink counterparts) that we have learned about all year long. After seeing the organs, you should be able to relate their structure to their function in the mink and the human body.

To begin your dissection, obtain some paper towels. Then, carefully cut open your mink bag over a sink. Dump the fluid in the bag into the sink with the water running. Then carefully remove your mink. Rinse the mink off under the running water and pat it dry with your paper towels. Place your mink on the dissecting pan and carefully bring it over to your lab table.

Next you will be “stringing” your mink to help secure it to the dissecting pan. Using the string, carefully tie one end around one of the mink’s forelimbs. Then, pull the string under the dissecting pan. Tie the other end of the string to the mink’s remaining forearm tightly, so that the arms are held open and the body is easily accessible. Do the same for the hind legs.

---

**Day 1**

**Neck**

Begin by cutting and separating the sternomastoid muscles in the neck. Be careful not to go too deep. Locate the **trachea**. It is a tube that runs from the larynx to the lungs. The trachea is held open by a series of cartilaginous rings in the wall. You can feel the cartilage rings when you run your finger along the trachea. Expose the entire length of the trachea. The swollen area at the anterior end of the trachea is the **larynx**. The larynx is formed by several cartilages and contains the vocal cords.

The **esophagus** is a collapsed tube located on the dorsal surface of trachea. Locate the esophagus and dissect it away from the trachea.
Thoracic Cavity

Use Diagram #2 to help you identify the structures in this section. Open the thoracic cavity by cutting through the muscles and rib cartilages on the left side of and parallel to the sternum. Keep the scissors pointed ventrally (toward you) as much as possible to avoid damaging structures in the cavity. Pull the walls of the cavity lateral breaking the ribs. The thymus gland is a mass of dark brown tissue embedded in the fat cranial to heart. Carefully remove the thymus and fat from around the major organs. Use a probe and forceps instead of a scalpel. Take care to avoid damaging the blood vessels.

The heart lies in the pericardial cavity, delineated by the tough pericardium. The lungs lie in the pleural cavities, the other subdivisions of the thoracic cavity. The right lung has three major lobes, the apical, cardiac, and diaphragmatic, and a fourth smaller intermediate lobe, more dorsal in position and associated with the postcava. The left lung has two lobes, the apical and diaphragmatic. Follow the trachea and esophagus as they enter the thorax. Dorsal to the heart, the trachea divides into left and right bronchi, which carry air to and from the lungs. Defer dissection of this region until after removal of the heart later on.

The esophagus continues dorsal to the heart and penetrates the muscular diaphragm to enter the abdominal cavity. The periodic contractions of the diaphragm, together with the forward and outward movement of the ribs, increase the volume of the pleural cavities and cause inspiration of air into the lungs.

Be sure you can identify the following parts:

- Trachea
- Larynx
- Esophagus
- Thymus gland
- Heart
- Pericardium
- Bronchi
- Right lung apical lobe
- Right lung cardiac lobe
- Right lung diaphragmatic lobe
- Right lung intermediate lobe
- Left lung apical lobe
- Left lung diaphragmatic lobe
- Diaphragm
DAY 2.

Use Diagrams 3, 4 and 5 to help you identify the structures in this section. Open the abdominal cavity by making a single incision through the ventral body wall from the end of the sternum to the pubis. Cut the body wall also along the edges of the rib cage and reflect the muscle sheets laterally to expose the viscera.

Anteriorly, the dark lobes of the liver should be visible. The mesentery between the liver and the diaphragm is the falciform ligament. It divides the liver into right and left sides. The lobe of the right side of the liver closest to the midline (the right median lobe) contains the dark green gall bladder. You may need to lift the right median lobe of the liver and look under it in order to see the gall bladder. You may need to cut and remove part of the right median lobe to see the gall bladder.

Identify the stomach. The stomach is attached to the liver and part of the small intestine by a mesentery called the lesser omentum. Attached to the greater curvature of the stomach is the greater omentum, an extensive sheet of mesentery laden with fat. It extends caudally and covers most of the remaining abdominal viscera. Cut the greater omentum near its attachment to the stomach and remove it. Try to keep all the other mesenteries intact. Identify the regions and parts of the stomach and cut it open to expose its inner surface. Note the gastric rugae, the large longitudinal ridges. Size of the stomach in the mink, as in other carnivores, depends on how recently and how well the individual ate. If the stomach in your animal is full of food, it may be enormous. The stomach is closed by contraction of the pyloric sphincter. When the sphincter relaxes, food is permitted to pass into the small intestine.
The spleen is a greenish-brown organ lying in a mesentery on the left side of the stomach. Locate the spleen. Identify the small intestine, which begins at the pyloric sphincter.

In the mesentery of the first part of the small intestine lies the right limb of the pancreas. It is pinkish (brown in some minks) and rather loose in structure. The left limb lies near the stomach and extends to the spleen. The products of the pancreas (digestive enzymes) and of the liver (bile) are carried into the small intestine by a common duct system. Find the large cystic duct from the gall bladder and several hepatic ducts from the liver. These join to form the common bile duct. Bile passes from the liver to the gall bladder, where it is stored and concentrated. Eventually it is emptied into the small intestine. The common bile duct enters the small intestine near the pylorus, and its point of entry may be marked internally by a small papilla. The two pancreatic ducts, one from each limb, join the common bile duct just before it enters the small intestine.

Occasionally one of the pancreatic ducts will have a separate entry to the intestine. The small intestine is divided into three segments: the duodenum, which begins at the pyloric sphincter, the jejunum, and the ileum. Identify the duodenum attached to the stomach. Identifying the jejunum and the ileum require histological (tissue) study. The ileum opens into the large intestine, or colon. There is no cecum, or pouch, developed at this point in the gut of the mink. The colon is not divisible into ascending, transverse, and descending segments as in many other mammals. It is instead a short descending tube that ends in the rectum.

The mink has a pair of anal glands associated with the rectum. They produce evil smelling musk and are usually removed during commercial preparation of dissection specimens. If they have not been removed, don't break them open.

Be sure you can identify the following parts:

- Diaphragm
- Liver
- Gall bladder
- Stomach
- Greater omentum
- Gastric rugae
- Pyloric sphincter
- Intestines
- Duodenum
- Pancreas
- Cystic duct
- Rectum
- Spleen
DAY 3.

The circulatory system of the mink consists of lymphatic ducts and the blood vascular system (heart, arteries, veins, portal veins, and capillaries). The arteries and veins of your specimen should be injected with colored latex -- red for systemic arteries and blue for systemic veins. The hepatic portal system, if injected, should be yellow. If it is not injected, the vessels can be traced because the dark brown coagulated blood is visible through the thin walls. Use forceps and a blunt or flexible probe when tracing vessels.

Arteries carry blood from the heart to capillary beds in either the lungs or the rest of the body. Arterial blood is under high pressure, and the walls of arteries are thick. Veins carry blood from capillary beds back to the heart. Venous blood is under low pressure, and the walls of veins are thin. Portal veins carry blood from one capillary bed to another without passing through the heart.

Use Diagrams 6 and 7 to help you identify the structures in this section. Cut the pericardium and open the pericardial cavity. Note that the pericardium extends onto the great vessels connected to the heart and is reflected back on them and on the heart surface as the epicardium, or visceral pericardium. Cut the systemic aorta, the precava, the azygos vein, and the postcava. Refer to Drawings 2 and 3 to help you identify the blood vessels. Gently lift the heart outwards and cut the pulmonary arteries and veins as close to the lungs as possible. The heart can then be removed from the body. Remove the excess fat from the epicardium.

The atria lie towards the right side of the chest. The ventricles are drawn to a point, the apex, on the left side. Identify the left and right atria. The atria are separated externally from the ventricles by the deep coronary sulcus. Right and left ventricles are separated externally by a shallow interventricular sulcus in the musculature. Identify the stumps of all blood vessels leading to and from the heart.

The heart musculature has its own blood supply, the coronary arteries. These arteries come off the systemic aorta and run in the coronary sulcus. Branches run from the sulcus to the atria and down the ventricles to the apex, supplying the muscular heart wall. The heart muscle capillaries are drained by a number of cardiac veins. Those draining the ventricular wall run from the apex toward the atria and empty into the coronary sinus on the dorsal surface of the heart. The coronary sinus empties into the right atrium.
Place the heart between your fingers with the apex pointing up and the dorsal and ventral surfaces touching your fingers. Keeping this orientation put the base of the heart (atria side) down on the dissecting tray. With your scalpel, section the heart by cutting lengthwise, between your fingers, from the apex to the base of the heart. Remove the coagulated blood and latex from the heart and wash out the cavities. Be especially careful around the valves. Identify the right and left atria, right and left ventricles, bicuspid and tricuspid valves, precava, postcava, aortic arch, pulmonary trunk, and pulmonary veins. Note the chordate tendineae and the papillary muscles. Note that the wall of the atrium is much thinner than the wall of the ventricle.

Be sure you can identify the following parts:

<table>
<thead>
<tr>
<th>External View</th>
<th>Internal View</th>
<th>Attached Blood Vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td>R. atrium</td>
<td>R. atrium</td>
<td>Precava</td>
</tr>
<tr>
<td>L. atrium</td>
<td>L. atrium</td>
<td>Post cava</td>
</tr>
<tr>
<td>R. ventricle</td>
<td>R. ventricle</td>
<td>Aortic arch</td>
</tr>
<tr>
<td>L. ventricle</td>
<td>L. ventricle</td>
<td>Pulmonary trunk</td>
</tr>
<tr>
<td>Coronary arteries</td>
<td></td>
<td>Pulmonary veins</td>
</tr>
<tr>
<td>Cardiac veins</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Use Diagrams 8, 9, 10 and 11 to help you identify the blood vessels. Clean the vessels in the thoracic cavity.

The systemic aorta curves dorsal as the aortic arch and then runs caudal as the thoracic aorta. Two major arterial trunks come off the arch of the aorta, the brachiocephalic and the left subclavian. The brachiocephalic gives off the right internal thoracic artery to the ventral chest and then divides into its three major branches, the left and right common carotids and the right subclavian artery.

The systemic drainage of the front part of the body is collected in the precava (or anterior vena cava). It is formed by the fusion of the right and left brachiocephalic veins. Each of these receives blood from the vertebral, internal jugular, external jugular, and subclavian veins. The internal jugular vein runs alongside the common carotid artery, and the vertebral and subclavian veins are close to the arteries of the same names. In the thorax the precava also receives blood from a single internal thoracic vein, which drains from both sides of the ventral chest wall, and from the azygos vein.

Trace the external jugular vein and its tributary veins on the surface of the right side of the neck and head. On the left side where the sternomastoid muscle has already been cut, locate the deeper vessels running alongside the trachea, the internal jugular vein and the common carotid artery. They run in a loose connective tissue sheath bound together with the vagus nerve. The internal jugular vein can be traced to its exit from the skull at the jugular foramen. It receives blood from sinuses in the skull and between the meninges of the brain. Each common carotid artery gives off small branches to the esophagus and trachea and, just caudal to the origin of the diagastric muscle, divides into the internal and external carotid arteries. In the abdominal cavity, first expose and study the hepatic portal vein and its tributaries. This system of veins drains capillaries in the walls of the gut and carries the blood to the sinuses of the liver. The hepatic portal vein is formed by the junction of three major tributaries, the superior and inferior mesenteric veins and the gastroplenic vein.
The liver has a dual blood supply. Blood in the hepatic portal vein is rich in nutrients freshly absorbed in the gut wall. Blood from the abdominal aorta (via a branch of the celiac artery) is rich in oxygen. The sinuses of the liver drain ultimately into the hepatic veins, which enter the postcava. The hepatic veins carry blood rich in waste materials and carbon dioxide. The hepatic veins may be found by cutting into the liver itself near the postcava.

The remaining vessels of the abdomen are the **abdominal aorta** and its arterial branches, and the **postcava** (posterior vena cava) and its tributaries. The abdominal aorta has three major branches in the gut, the **celiac** and the **superior** and **inferior mesenteric arteries**. The celiac artery splits into several branches, which supply the liver, stomach, spleen, duodenum, and part of the pancreas. The superior mesenteric artery supplies most of the remainder of the intestines and the remainder of the pancreas. The inferior mesenteric artery supplies the lower part of the large intestine and the rectum.

The other branches of the abdominal aorta are associated with tributaries of the postcava -- the **renal**, **adrenolumbar**, **iliolumbar**, **iliac**, and **caudal** vessels. The arteries to the gonads come off the abdominal aorta cranial to the iliolumbar branches -- **ovarian arteries** in the female and **spermatic arteries** in the male. Venous return from the gonads enters the postcava on the right side and the renal vein on the left.

Be sure you can identify the following parts:

<table>
<thead>
<tr>
<th>Arteries</th>
<th>Veins</th>
<th>Aortic arch</th>
<th>Precava</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thoracic aorta</td>
<td>Post cava</td>
<td>Brachiocephalic artery</td>
<td></td>
</tr>
<tr>
<td>Internal jugulars</td>
<td>Left subclavian artery</td>
<td>External jugulars</td>
<td>Common carotids</td>
</tr>
<tr>
<td>Subclavian veins</td>
<td>Abdominal aorta</td>
<td>Azygous vein</td>
<td>Renal artery</td>
</tr>
<tr>
<td>Hepatic portal vein</td>
<td>Iliac artery</td>
<td>Renal vein</td>
<td>Iliac vein</td>
</tr>
</tbody>
</table>

![Diagram #10](Diagram #10)

![Diagram #11](Diagram #11)
DAY 5

Use Diagram 12 to help you identify the structures in this section. Carefully remove the fat surrounding the kidneys and genital organs. Use forceps and a blunt probe. Save all the ducts and blood vessels. Expose the kidneys. They lie against the dorsal body wall and are covered by parietal peritoneum. The adrenal glands are small dark brown bodies lying in the fat medial to each kidney. The right adrenal gland lies dorsal to the right renal vein. Find and clean the ureters, renal artery, renal vein and trace them to their connections to the urinary bladder. The bladder is connected to the ventral body wall by a suspensory ligament. Urine passes from the kidneys to the bladder via the ureters and is stored there.

The urine eventually passes from the bladder to the outside of the body through the urethra. The kidney of the mink is bean-shaped, having a convex lateral border and an indentation, the hilus, medially. The ureter, renal artery, and renal vein enter the kidney at the hilus. Remove one kidney and slice it longitudinally in the frontal plane with your scalpel. Internally, two zones of tissue can be distinguished macroscopically -- the outer granular cortex, and the inner striated medulla. The glomeruli and capsules of the kidney tubules are in the cortex, and the loops of Henle and the collecting tubules are in the medulla. In the mink all collecting tubules converge at a single papilla, where the urine is emptied into a cavity, the renal pelvis. The renal pelvis is drained by the ureter.

Be sure you can identify the following parts:

- Kidney
- Ureter
- Urinary bladder
- Renal vein
- Renal cortex
- Renal medulla
- Renal pelvis
- Renal artery
**FEMALE REPRODUCTIVE TRACT**

Use Diagram 13 to help you identify the structures in this section. Expose the **ovaries**, **oviducts**, and **uterus**. Size and morphology of these structures vary with the reproductive state of the animal. If your mink is a fall-killed young female that has never born kits, the uterus will be thread-like and the ovaries and oviducts very small and difficult to study in detail. The uterus of the mink is biocornuate, having two **horns** which meet dorsal to the urinary bladder to form the **body** of the uterus. Each horn is supported by a sheet of mesentry called the **broad ligament**.

**MALE REPRODUCTIVE TRACT**

Use Diagram 14 to help you identify the structures in this section. Find the **testicles** and lean them of fat. In the intact animal they are enclosed in a skin pouch, the **scrotum**, which is removed with the pelt. The tough sheath of the testicle is the **vaginal tunic**, an extension of the parietal peritoneum of the body cavity. Cut the tunic open and identify the **testis**, **epididymis**, and **vas deferens**. Sperm are produced in the testis, are stored in the epididymis, and eventually pass into the vas deferens. Trace the vas deferens to its entry into the abdominal cavity, over the ureter, and down the dorsal surface of the urinary bladder.

Be sure you can identify the following parts:

**Female**
- Ovaries
- Horn of the uterus
- Body of the uterus

**Male**
- Testes
- Epididymis
- Vas deferens
- Penis