

The Norwegian White Rat Dissection

Observational Study

The body systems of the white rat are very similar to human body systems. Dissecting a rat gives you a good idea of what the digestive, respiratory, and circulatory systems of human look like. At the end of the dissection, you will have viewed all of the major structures of the system studied in class. However, the systems will not necessarily be viewed in sequence. Rather, you will be guided to view the structures as they become visible during the dissection.

Purpose

The purpose of this investigation is to examine the structures and arrangements of the digestive, respiratory, and circulatory systems of the Norwegian white rat.

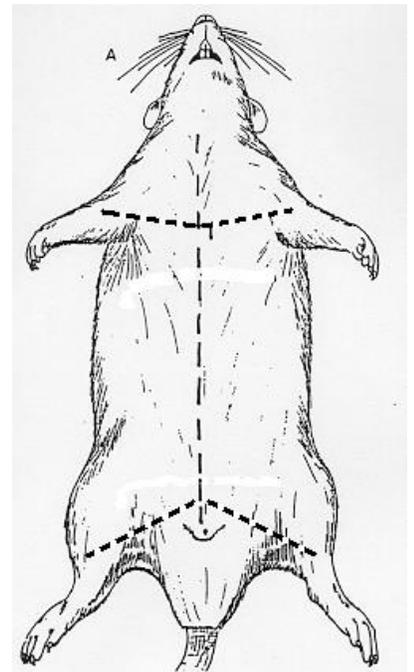


Wear your eye protection, gloves and apron at all times during the dissection and the clean up!

Procedure

Part A: Preparation for the Dissection

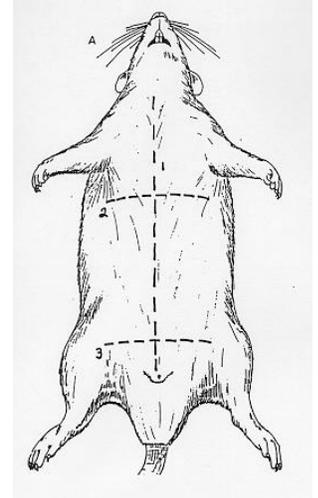
1. Place the rat on its back
2. Begin by giving the rat a little bit of a massage on its stomach in an attempt to separate its skin from its muscles. You should be able to feel the two separating.
3. Use your **scalpel** to do the first small incision of your double Y incision and continue with the **scissors**. (*Remember to cut away from your body*)
 - a. Be careful only to cut through the skin
 - b. Cut straight up to the neck area, and then all the way down to the legs
 - c. With your **scissors**, continue to cut toward the arms and the legs on both sides as seen on your diagram.
4. The skin should not be removed. It should only be separated from the muscle.
5. Gently use your **probe** to separate the skin from the muscle tissue. Pull back the flaps of skin and use **pins** to hold them down in dissection tray.



Part B: The Abdominal Cavity

- 1) With your fingers feel for the **ribs**. Your next incision will be just **below** the rib cage. Be sure that this incision is a very shallow one as you do not want to damage any of the digestive organs.
- 2) Use the **scissors** to cut down towards the legs.
- 3) Make two **lateral cuts** just below the rib cage which will allow you to open the flaps of muscle to have access to the digestive organs.
- 4) Two lateral cuts should also be made just above the leg level.
- 5) Remove the **pins** used to stabilize the skin of the rat, and replace them as such to anchor both the muscle flap and the skin flap, ensure an open abdominal cavity.

- 6) Locate the **liver**, which lie immediately posterior to the diaphragm. Examine the liver, and note that there are ____ lobes.
- 7) Use the **probe** to move the lobes of the liver and locate the **gall bladder**.
- 8) Follow the **bile duct** leading from the gall bladder to where it empties in the **small intestine**. (*Be careful not to damage any other organs*).
- 9) Lift the liver and identify the J shaped **stomach**. Note where the esophagus joins the stomach and where to stomach joins the duodenum of the small intestine.
- 10) Where the stomach meets the small intestine, use the probe and forceps to separate the thin connective tissue that holds the organs in place in the abdominal cavity.
 - a. Straighten the first section of the small intestine and identify the **pancreas**. Describe the appearance of the pancreas.



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- 11) **Remove the stomach** by cutting across the esophagus at the top, and again at the bottom of the stomach near the small intestine.
 - a. Make a medial incision along the length of the stomach and open it.
 - b. Rinse the inside of the stomach with water. Observe the inner lining of the stomach and describe it.

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- 12) Separate the connective tissue and straighten the small and large intestines. **Measure** the lengths of the small intestine and the large intestine with a ruler

Small intestine _____ cm

Large intestine _____ cm

- 13) Make a medial incision along the length of both intestines and open them. Rinse the inside of the intestines with water, observe the inner linings and describe them.

Part C: The Thoracic Cavity

- 1) Use the **scissors** to cut upward along the ribcage between the ribs.
- 2) Use the **scalpel** to separate and remove the diaphragm from the body wall
- 3) **Pin** both sides of the rib cage flaps to your dissection tray.

- 4) **Locate the heart**
 - a. Using the **forceps** and the **probe**, remove the pericardium (thin connective tissue) from the outer surface of the heart.
 - b. Observe the structure of the heart and the major blood vessels leading to and from the heart.
- 5) Using the **probe** and **forceps**, tease away the connective tissue from around the major blood vessels leading to and from the heart.
- 6) **Remove the heart** by cutting the blood vessels about 2 cm from the heart.
- 7) Examine the heart and identify the following structures:
 - a. Right and left atrium
 - b. Right and Left Ventricles
 - c. Aorta
 - d. Pulmonary artery
 - e. Pulmonary vein
 - f. Superior and inferior vena cava
- 8) Make a **diagonal incision** through the heart and expose the chambers of the heart.
- 9) Follow the path of the blood through the chambers and major blood vessels attached to the heart

- 10) Find the **trachea** and the **bronchi** leading to the lungs.
- 11) Use your fingers to examine the trachea. Describe how the trachea feels to the touch

- 12) Locate the **lungs**, which lie underneath and to either sides of the heart. Remove the lungs and describe their look and feel.
