



The Thoracic Organs

► Procedure: Cut through the abdominal wall of the rat following the incision marks in the picture. Be careful not to cut too deeply and keep the tip of your scissors pointed upwards. Do not damage the underlying structures. Once you have opened the body cavity, you will need to rinse it in the sink.

1. Locate the **diaphragm**, which is a thin layer of muscle that separates the thoracic cavity from the abdominal cavity.

2. The **heart** is centrally located in the thoracic cavity. The two dark colored chambers at the top are the **atria** (single: atrium), and the bottom chambers are the **ventricles**. The heart is covered by a thin membrane called the **pericardium**. (We will come back to the heart later.)

3. Locate the **thymus gland**, which lies directly over the upper part of the heart. The thymus functions in the development of the immune system and is much larger in young rats than it is in older rats.

4. The **bronchial tubes** branch from the trachea and enter the **lungs** on either side. The lungs are large spongy tissue that take up a large amount of the thoracic cavity. Bronchial tubes may be difficult to locate because they are embedded in the lungs.

The Abdominal Organs

1. The **coelom** is the body cavity within which the viscera (internal organs) are located. The cavity is covered by a membrane called the peritoneum, which covers four regions:

visceral peritoneum - covers the internal organs

mesenteries - attach the internal organs to the dorsal body wall

omenta - connect organ to organ

2. Locate the **liver**, which is a dark colored organ suspended just under the diaphragm. The liver has many functions, one of which is to produce bile which aids in digesting fat. The liver also stores glycogen and transforms wastes into less harmful substances. Rats do not have a gall bladder which is used for storing bile in other animals. There are four parts to the liver:

median or cystic lobe - located atop the organ, there is a central cleft

left lateral lobe - large and partially covered by the stomach

right lateral lobe - partially divided into an anterior and posterior lobule, hidden from view by the median lobe

caudate lobe - small and folds around the esophagus and the stomach, seen most easily when liver is raised

3. The **esophagus** pierces the diaphragm and moves food from the mouth to the stomach. It is distinguished from the trachea by its lack of cartilage rings.

4. Locate the **stomach** on the left side just under the diaphragm. The functions of the stomach include food storage, physical breakdown of food, and the digestion of protein. The opening between the esophagus and the stomach is called the cardiac sphincter. The outer margin of the curved stomach is called the **greater curvature**, the inner margin is called the **lesser curvature**.

5. Slit the stomach lengthwise and notice the ridges, called **rugae**. The attachment between the stomach and the intestine is called the **pyloric sphincter**.

6. The **spleen** is about the same color as the liver and is attached to the greater curvature of the stomach. It is associated with the circulatory system and functions in the destruction of blood cells and blood storage. A person can live without a spleen, but they're more likely to get sick as it helps the immune system function.

7. The **pancreas** is a brownish, flattened gland found in the tissue between the stomach and small intestine. The pancreas produces digestive enzymes that are sent to the intestine via small ducts (the pancreatic duct). The pancreas also secretes insulin which is important in the regulation of glucose metabolism. The **greater omentum** is the membranous curtain of tissue that hangs from the stomach and contains lymph nodes, blood vessels, and fat. Find the pancreas by looking for a thin, almost membrane looking structure that has the consistency of cottage cheese.

8. The **small intestine** is a slender coiled tube that receives partially digested food from the stomach (via the pyloric sphincter). It consists of three sections: **duodenum**, **ileum**, and **jejunum**.

9. Use your scissors to cut the mesentery of the small intestine, but do not remove it from its attachment to the stomach and rectum. If you are careful you will be able to stretch it out and untangle it so that you can see the relative lengths of the large and the small intestine.

10. Locate the **colon**, which is the large greenish tube that extends from the small intestine and leads to the anus. The colon is also known as the **large intestine**. The colon is where the final stages of digestion and water absorption occurs and it contains a variety of bacteria to aid in digestion. The colon consists of five sections:

11. Locate the **cecum** - a large sac in the lower third of the abdominal cavity, it is a dead-end pouch and is similar to the appendix in humans. It also is the point at which the small intestine becomes the large intestine.

12. Locate the **rectum** - the short, terminal section of the colon between the descending colon and the anus. The rectum temporarily stores feces before they are expelled from the body.

