Anatomy of a Rat
Dissection Guide
Clip

- Clip the fur ventrally from genitalia to neck.
Midline Incision

- Hold the scalpel like a pencil with the long side against the skin.
- Stretch the skin between your thumb and index finger of the other hand.
- Place the scalpel blade behind your fingers so you are moving toward the stretched skin.
- Apply pressure with the blade to cut through the skin.
- Leave the blade in place and move only the hand that is stretching the skin as you move down the incision line.
Separate skin from muscle

- Use the rat toothed forceps to hold the skin up.
- Cut through the connective tissue using the scalpel blade against the skin (not the muscle).
Penis
Preputial gland

- The preputial gland lies between the skin and the muscle wall.
- Preputial means around the prepuce (skin around the penis).
- They are found in the female but are smaller than in the male.
The linea alba is the white line that runs down the midline.
- It has fewer blood vessels.
- Surgical incisions on the linea alba are less prone to dehiscence.
- Make your midline incision down the linea alba.
Xiphoid Process

• The xiphoid process is the cartilaginous tip to the sternum.

• The notch between the xiphoid process and the last rib is your entry point for the cardiac puncture.
Abdominal (Peritoneal) Cavity

*in situ*

- Xiphoid Process
- Liver
- Intestines
- Bladder
- Stomach
- Cecum
Extracting the Testes

• Pull on the dorsal-lateral fat pad to pull the testicles out of the scrotal sac.

• The tail of the epididymus is attached to the scrotal sac via the gubernaculum, fibrous strands of tissue that guide the testicles through the inguinal ring.
Testis

Vas deferens

Pampiniform Plexus (Testicular Artery and Vein)

Testis
Structures around the Testis

- **Epididymus**: This organ wraps around the testis. It has a comma-shaped head on the cranial surface, a thin body laterally, and a teardrop-shaped tail on the caudal side.

- **Vas deferens**: This is the tube which carries the sperm from the tail of the epididymus to the urethra. It is surrounded by connective tissue and has an associated blood vessel. It is separated from the testis by this connective tissue.

- **Pampiniform plexus**: This is the blood vessel complex that feeds the testis. It is dark red and lies within a fat pad. It enters the testis on the cranial side.
Epididymus

- Epididymal head (caput)
- Epididymal body (corpus)
- Epididymal tail (cauda)
- Vas deferens
- Pampiniform plexus
- Testis
Male Genitalia

- Seminal Vesicle
- Vas deferens
- Prostate Gland
- Testis
- Bladder
- Penis
- Preputial Gland
**Seminal Vesicles and Coagulating Gland**

- Seminal vesicles are leaf-shaped yellowish organs.
- Coagulating glands lie on the concave side (dorsal-caudal) of the seminal vesicles and are pinkish.
Prostate and Bladder

• The urinary bladder is tear-dropped shaped and distensible
  – If filled with urine, it may be quite large and yellow.
  – If empty, it will be opaque white and small.

• The prostate lies at the base of the urinary bladder. It is divided into 4 lobes, 2 ventral, 2 dorsal.
Female Genitalia

Uterus is bifurcated in the rodent. There is no uterine body but rather 2 uterine horns. Ovaries are located in the fat pad at the cranial end of each uterine horn.
Stomach

• The stomach lies under the ribs and liver on the rat’s left side.

• The stomach is divided into 2 compartments
  – Cardiac: green, aglandular
  – Pyloric: pink, glandular and muscular
Small Intestine

- The small intestine is divided into 3 components:
  - Duodenum (first 10%)
  - Jejunum (middle 85%)
  - Ileum (last 5%)
Pancreas

• The pancreas is a diffuse organ in the rat lying between the stomach and the spleen and within the first loop of the duodenum.
Intestines

• The stomach empties into the small intestines.
• The cecum divides small and large intestine.
• The cecum is a blind pouch with small intestine entering more centrally.
• Large intestine is divided into the ascending, transverse, and descending colon. By the descending colon, you should be able to see fecal boli.
Spleen

• The spleen lies on the animal’s left, just underneath the stomach. It is dark, flat, and elongated.
Kidney

• The kidneys are paired organs which lie in the back of the abdominal cavity on a fat pad. They look just like kidney beans.

Renal vein

Left kidney
Adrenal Gland

- The adrenal gland is a small endocrine gland that lies above the kidney. It is found within the same fat pad as the kidney.
Diaphragm

• The diaphragm divides the abdominal and thoracic cavities.
• The diaphragm muscle pulls down during inspiration and relaxes during expiration.
Thoracic Cavity

- Heart
  - Atria are small and dark
  - Ventricles are larger, lighter in color and more muscular
- Lungs
  - 3 lobes on right, 1 lobe on left
- Thymus gland
  - Looks like a fat pad on top of the heart but is actually part of the immune system.
Neck

- Masseter muscle
- Salivary glands
  - Sublingual
  - Submandibular
  - Parotid
- Jugular vein
Jugular Vein

• To collect blood from the jugular vein:
  – Make a skin incision and expose the vein
  – Insert the needle through the pectoral muscle. The muscle will compress the vein when the needle is withdrawn.
Trachea

- The trachea lies underneath the salivary glands and the muscles of the neck.
  - It has cartilagenous rings along the length.
Larynx and Thyroid

• At the cranial aspect of the trachea is the larynx. It is distinguished by its “saddle-shaped” cartilage.

• Just caudal to the larynx is the thyroid. It forms a red band that wraps around the larynx.
Esophagus

• The esophagus is directly behind and firmly attached to the trachea. It has muscular walls without any cartilage.
The Skull

- Decapitate your rat carcass.
- Cut the skin longitudinally from neck to nose and peel the skin back to see the skull.
- To remove the center section of the skull
  - Insert the sharp edge of your scissors into the foramen magnum
  - Cut along the 2 lateral ridges and across the rostral margin.
Dorsal View of the Brain

- Cerebral hemispheres (or cerebrum)
- Cerebellum
- Pineal gland: This small gland lies in the triangular junction between the cerebrum and cerebellum.
Olfactory and Optic Nerves

- Olfactory nerves extend from the cerebrum into the rostrum or nasal cavity. They are thick and are superior to the optic nerves.
- The Optic nerves lie in the base of the cranial cavity underneath the cerebrum. They are very thin. They cross at the optic chiasm underneath the hypothalamus.
Hypothalamus

- The hypothalamus is inferior to the cerebral cortex. To see it, peel the brain out of the cranial cavity. It lies in the center.
Pituitary

- The pituitary sits in a depression in the floor of the skull called the *sella turcica*. It is attached to the hypothalamus via the infundibulum.
  - The inferior and lateral (pink) portion of the pituitary is the anterior pituitary and is regulated by releasing factors from the hypothalamus via a portal system in the infundibulum.
  - The superior wedge (grey) is the posterior pituitary and is innervated by axons coming from the hypothalamus and down the infundibulum.
The Hardarian gland lies behind the eyeball and is larger than the eyeball.