**Day 6 Urogenital System:**

![Diagram of the Urogenital System](image)

**Urinary System**

The structures of the reproductive and urinary systems are often considered together as the *urogenital systems*, since they have common embryological origins. However, the emphasis in this dissection is on identifying the structures of the urinary tract with only a few references to contiguous reproductive structures. The anatomy of the reproductive system is studied in the next section.

**Identifying Organs of the Urinary System**

1. Obtain your dissection specimen and place it on your dissection tray. Reflect the abdominal viscera (most importantly the small intestine) to locate the kidneys high on the dorsal body wall. Note that the *kidneys* in the cat, as well as in the human are retroperitoneal (behind the peritoneum).

2. Carefully remove the peritoneum, and clear away the bed of fat that invests the kidneys. Then locate the adrenal (suprarenal) glands that lie superiorly and medial to the kidneys.
3. Identify the **renal artery** (red latex injected), the **renal vein** (blue latex injected), and the ureter at the hilus region of the kidney. (You may find two renal veins leaving one kidney in the cat but not in humans).

4. Trace the **ureters** to the **urinary bladder**, a smooth muscular sac located superiorly to the small intestine. If your cat is a female, be careful not to confuse the ureters with the urine tubes, which lie superior to the bladder in the same general region. See Figure D8.1. Observe the sites where the **ureters** enter the bladder. How would you describe the entrance point anatomically?

5. Cut through the bladder wall, and examine the region of the urethral exit to see if you can discern any evidence of the **internal sphincter**.

6. If your cat is a male, identify the prostate gland (part of the male reproductive system), which encircles the urethra distal to the neck of the bladder. Notice that the urinary bladder is somewhat fixed in position by ligaments.

7. Using a probe, trace the urethra as it exits from the bladder to its terminus in the **urogenital sinus**, a common chamber into which both the vagina and the urethra empty in the female cat, or into the penis of the male. Dissection to expose the urethra along its entire length should not be done at this time because of possible damage to the reproductive structures, which you will study in an upcoming section.

8. Before cleaning up the dissection materials, observe a cat of the opposite sex.

   • In the human female, the vagina and the urethra have separate external openings.
Analysis Questions-Urogenital System

Log into QUIA using your Team’s Username and Password provided by your instructor. As your group works on the DAY 6 assignment of the cat dissection, enter your responses to the Analysis Questions into QUIA-Day 6. Your team may save your work from class and return to finish the assignment until the due date (see assignment sheet). When the section is complete, select “submit” to send your Analysis Question responses to your instructor. The reference diagrams in this eBook are also available online so that you can zoom in and out.

Question 35
Locate the following urinary structures and describe their functions:

a. urinary bladder

b. urethra

c. kidney

d. ureter

Locate the large bean shaped kidney along the dorsal surface of the abdominal cavity. Carefully cut away the surrounding fat and trace the ureter to the bladder. Now remove one kidney from the cat. Cut the kidney in half to reveal the internal structures.

Question 36
In which portion of the kidney would you find the nephrons?

Question 37
What function does the renal pelvis serve?

Question 38
The kidneys are considered “retroperitoneal” organs. What does this mean?
Reproductive System

In this part of the lab, you will need to locate the reproductive structures on your cat and a cat of the opposite sex. Be prepared to teach another group about your cat!

Identifying Organs of the Female Reproductive System
Refer to the reference diagrams showing a dissection of the urogenital systems of the female cat as you identify the structures described below.
1. Unlike the pear-shaped simplex, or one-part, uterus of the human, the uterus of the cat is Y-shaped (Bipartite or bicornuate) and consists of a **uterine body** from which two **uterine horns** (cornua) diverge. Such an enlarged uterus enables the animal to produce litters. Examine the abdominal cavity and identify the bladder and the body of the uterus lying just dorsal to it.

2. Follow one of the uterine horns as it travels superiorly in the body cavity. Identify the thin mesentery (the **broad ligament**), which helps anchor it and the other reproductive structures to the body wall. Approximately halfway up the length of the uterine horn, it should be possible to identify the more important **round ligament**, a cord of connective tissue extending laterally and posteriorly from the uterine horn to the region of the body wall that would correspond to the inguinal region of the male.

3. Examine the **uterine tube** and **ovary** at the distal end of the uterine horn just caudal to the kidney. Observe how the funnel-shaped end of the uterine tube curves around the ovary. As in the human, the distal end of the tube is fimbriated, or fringed, and the tube is lined with ciliated epithelium. The uterine tubes of the cat are tiny and much shorter than in the human. Identify the **ovarian ligament**, a short thick cord that extends from the uterus to the ovary and anchors the ovary to the body wall. Also observe the **ovarian artery** and **vein** passing through the mesentery to the ovary and uterine structures.

4. Return to the body of the uterus and follow it caudal to the bony pelvis. Use bone cutters to cut through the median line of the pelvis (the pubic symphysis), cutting carefully so
you do not damage the urethra deep to it. Expose the pelvic region by pressing the thighs dorsally. Follow the uterine body caudally to the vagina, and note the point where the urethra draining the bladder and the vagina enter a common chamber, the urogenital sinus. How does this anatomical arrangement compare to that seen in the human female?

5. Observe the vulva of the cat, which is similar to the human vulva. Identify the raised labia majora surrounding the urogenital opening.

6. To determine the length of the vagina, which is difficult to ascertain by external inspection, slit through the vaginal wall just superior to the urogenital sinus and cut toward the body of the uterus with scissors. Reflect the cut edges, and identify the muscular cervix of the uterus. Approximately how long is the vagina of the cat? (Measure the distance between the urogenital sinus and the cervix.)

7. When you have completed your observations of both male and female cats, clean your dissecting instruments and tray and properly wrap the cat for storage.

**Question 39**
Locate and describe the functions of the following reproductive structures:

**Female**

a. ovary

b. uterus (left and right horns)

c. vagina

d. uterine tube (oviduct)
**Question 40**
Explain the pathway of an egg from the ovary to the site of implantation.

**Question 41**
Explain the pathway of a sperm cell from testis to ejaculation.

**Question 42**
How does the function of a male’s urethra differ from that of a female?

**Question 43**
How does the uterus of a female cat differ from that of a human female?
Identifying Organs of the Male Reproductive System
Refer to the reference diagrams as you identify the male structures.
1. Don gloves. Identify the **penis** and notice the prepuce covering the glands. Carefully cut through the skin overlying the penis to expose the cavernous tissue beneath, then cross section the penis to see the relative position of the three cavernous bodies.

2. Identify the **scrotal sac**, and then carefully make a shallow incision through the scrotum to expose the **testes**. Notice that the scrotum is divided internally.

3. Lateral to the medial aspect of the scrotal sac, locate the **spermatic cord**, which contains the spermatic artery, vein, and nerve, as well as the ductus deferens, and follow it up.
through the inguinal canal into the abdominal cavity. (It is not necessary to cut through the pelvic bone; a slight tug on the spermatic cord in the scrotal sac region will reveal its position in the abdominal cavity.) Carefully loosen the spermatic cord from the connective tissue investing it, and follow its course as it travels superiorly in a pelvic cavity. Then follow the ductus deferens as it loops over the ureters, * and then courses posterior to the bladder and enters the prostate gland. Using bone cutters, carefully make an incision through the pubic symphysis to follow the urethra.

4. Notice that the **prostate gland** is comparatively smaller in the cat than in the human, and it is more distal to the bladder. (In the human, the prostate gland is immediately adjacent to the base of the bladder.) Carefully slit open the prostate gland to follow the ductus deferens to the urethra, which exits from the bladder midline. The male cat urethra, like that of the human, serves as both a urinary and sperm duct. In the human, the ductus deferens is joined by the duct of the seminal vesicle to form the ejaculatory duct, which enters the prostate.Seminal vesicles are not present in the cat.

5. Trace the **urethra** to the proximal end of the cavernous tissue of the penis. Carefully split the proximal portion of the penis along a sagittal plane to reveal the **bulbourethral glands** lying beneath it.

6. Once again, turn your attention to the testis. Cut it from its attachment to the spermatic cord and carefully slit open the **tunica vaginalis** capsule enclosing it. Identify the **epididymis** running along one side of the testis. Make a longitudinal cut through the testis and epididymis. Can you see the tubular nature of the epididymis and the rete testis portion of the testis with the naked eye?

* This portion of the spermatic cord and ductus deferens is due to the fact that during fetal development, the testis was in the same relative position as the ovary is in the female. In its descent, it passes laterally and ventrally to the ureters.

**Question 44**

Locate and describe the functions of the following reproductive

**Male**

a. testis

b. scrotum

c. penis
d. ductus deferens (vas)