

**BIOL 244L HUMAN ANATOMY AND PHYSIOLOGY II LABORATORY
REPRODUCTIVE SYSTEM I. REPRODUCTIVE SYSTEM ANATOMY.**

REPRODUCTIVE ANATOMY OF THE CAT

Collectively, the male and female reproductive systems consist of organs that produce the gametes (sperm and eggs), ducts for conducting the gametes and nurturing the developing fertilized egg and embryo, glands to support the gametes, and glands for endocrine control of reproduction. We will study these structures in cats, and be sure to look at both a female and male cat among your working groups. We also have demonstration organ specimens from pigs. During development, many of these structures in the male and female develop from the same embryonic tissues. The genetics of sex determination and hormones produced subsequently determine whether these tissues develop to become male or female structures. Some of the structures we will study today in the cat are rather small and require careful dissection work.

I. MALE REPRODUCTIVE SYSTEM, CAT

The **testes** (singular testis) of mammals descend from the peritoneal cavity during development and lie in a sac, the **scrotum**, outside the abdomen. Cut through the scrotal skin on each side and locate cord-like sacs called **cremasteric pouches**. These consist of epithelium, fascia, and muscle drawn down from the abdominal cavity as the testes descended. In order to see the reproductive anatomy more clearly, the pelvic canal must be opened. During this procedure, avoid cutting the cremasteric pouches or the **penis**. Refer to the diagram 11-7 at the back of the handout. First trace the cremasteric pouches as they extend from the testes across the ventral surface of the pelvic girdle and to the **inguinal canal**. Locate the **penis** emerging from the caudal end of the pelvic canal. In order to trace the structures in the lower reproductive tract, the pelvis has to be cut at the pubic symphysis. First, cut the ventral ligament of the bladder, and reflect the bladder away from the pubic symphysis. Cut through the mid-ventral muscles and, using bone scissors, cut through the pubic symphysis. Open the pelvic canal by bending the thighs dorsally, which will probably break additional pelvic bones. Leave the cremasteric pouch intact on one side, and cut open longitudinally the other side down to the testis. The **ductus (vas) deferens** lies within. Close to the testes, the ductus deferens becomes convoluted and coiled and merges with the **epididymis**, a band shaped structure lying against the testis. Spermatozoa formed in the testes are collected into the epididymis and conducted to the ductus deferens. Sterilization by the vasectomy procedure involves cutting the ductus deferens, which blocks passage of spermatozoa but not the passage of more distally secreted seminal fluid during sexual intercourse.

Above the inguinal canal, the ductus deferens passes forward in the peritoneal cavity, then crosses over the ureter and runs caudally into the pelvic canal between the **urethra** and large intestine. Finally, the **ductus deferentes** (plural of ductus deferens) of both sides converge and enter the urethra. At the point of entry, the **prostate gland** is present. This is one of the accessory male glands that produce nutritive fluid added to the spermatozoa to form the seminal fluid (semen). The **urethra** below this point is the common duct for both urine and semen. The **penis** encloses the urethra as it leaves the pelvic canal. Within the penis, two columns of spongy erectile tissue, the **corpora cavernosa** contain numerous blood sinuses; erection of the penis is caused by engorgement of these sinuses with blood. Make a cross section of the penis to see the relations of the two corpora cavernosa to the urethra. Look at the specimen under the dissecting microscope at the front of the laboratory. The free end of the penis sheathed in a fold of skin is the **glans penis**. It

is homologous (develops from the same embryonic tissue) to the female clitoris. Make a cross section through the glans, and look for a small bone, the **os penis**, that lies on the surface of the urethra and stiffens this part of the penis. It is small and thin in cats and may be difficult to find. The os penis is present in cats and other members of the mammalian order, carnivora, and also in certain other mammalian orders, but not in humans and other primates. Whalers used the os penis of their prey for walking sticks.

II. FEMALE REPRODUCTIVE SYSTEM, CAT

The **ovaries** lie just caudal to the kidneys. On the surface of the ovary, you may be able to see bulging vesicles which are the **Graafian follicles**, each of which contains a developing egg. When eggs are released from the ovary they are released into the peritoneal cavity, but quickly find their way to the funnel-shaped entrance of the **uterine tube (fallopian tube)**. Female sterilization by the tubal ligation procedure involves tying off the fallopian tubes to block passage of eggs to the uterus. The uterine tube courses around the ovary and then enters the **uterine horn**. The **uterus** in cats is a Y-shaped structure with a central **body** and **two uterine horns**. Fertilized eggs will implant in both horns of the uterus for what will eventually be a litter of kittens. In order to see the remaining reproductive anatomy, the pelvic canal must be opened as above for the male. Refer to the figure at the end of this handout. Cut the ventral ligament of the bladder, and reflect the bladder away from the pubic symphysis. Cut through the mid ventral muscles, and, using bone scissors, cut through the pubic symphysis. Open the pelvic canal by bending the thighs dorsally. The body of the uterus is not long and leads to the **vagina**; the distinction between the two is not clear from the outside of the tract but will be from inside (see below). Follow the **urethra** and find the point where it unites with the vagina. The remaining urogenital tract, the **urogenital sinus**, is a relatively long passage in most mammals, but not in primates. The comparable structure in human females is the vulva, which is shallow, and the urethra and the vagina remain separate passages nearly to the body surface. Make a lateral incision in the body of the uterus and extend it to the opening of the urogenital sinus to the outside. The posterior portion of the uterus forms a rounded projection called the **cervix**. This is the boundary between the uterus and vagina, and the vagina extends to the urethral orifice. The common passage beyond is then the urogenital sinus which extends to the body surface where it is bounded by folds of skin called the **labia majora**. Near the urogenital aperture in the ventral wall of the urogenital sinus, is the **clitoris**, which is homologous to the glans penis in the male. The female labia majora are homologous to the scrotum in the male.

III. REPRODUCTIVE TRACT ANATOMY OF THE PIG

At the front of the room are reproductive tract tissues from an adult male and adult female pig. Along with study of the reproductive anatomy of the cat, and the illustrations in chapter 28 of the text, identify the corresponding reproductive tract tissues of the pig. Although these tissues have been dissected from the body and there are a few particular specializations about the pig anatomy, you will find the structures pretty easy to identify because they are so much larger than in the cat.

1. Male. One of the **testes** is enclosed in the **cremasteric pouch** tissues indicative of its earlier descent through the inguinal canal. The other one has been removed from the cremasteric pouch and sectioned. Find the **seminiferous tubules** inside the testis and the convoluted tubule of the **epididymis** lying along the outside of the testis. The **epididymis** straightens out and widens to become the **ductus deferens**, which conducts the spermatozoa up through the inguinal canal to the urethra. The other tissue here is the penis, which has the same basic structures as in the cat and human but is highly elongated in the pig. The **glans** of the pig penis is spiral in shape (it is no myth

that pigs have a corkscrew shaped penis - at least as far as the glans is concerned). The elongated shaft lies largely withdrawn into the tissues of the abdominal wall except during copulation. The shaft contains a single **corpus cavernosum** with its venous sinuses. You can observe these sinuses macroscopically at the places where the penis here has been partially sectioned.

2. Female. Find the **ovary** with its **Graafian follicles**, the small diameter and short **uterine tube**, and the larger horn of the **uterus** (only one horn is present in these specimens). The long horns of the bicornate pig and cat uterus are adapted for implantation of many fertilized oocytes and large litters of piglets and kittens. Look at the cut surface of a uterine horn to see the richly vascular **endometrium**.

IV. Human Male and Female Reproductive System Models

Use the anatomical models as well as the figures from Chapter 28 of the text to learn the following anatomical structures.

Male

Testes
Scrotum
Ductus (vas) deferens
Epididymis
Urethra
Prostate Gland
Penis
Glans Penis
Corpora cavernosa

Female

Ovaries
Uterine (fallopian) tubes
Uterus*
Cervix
Vagina
Urethra
Labia majora
Clitoris

*Note: While cats have 2 uterine horns and a central body of the uterus to accommodate a large number of fetuses, humans have a single uterus.

Illustrations from:

Gilbert, Steven G. Pictorial Anatomy of the Cat. 1975. University of Washington Press.

Walker, Warren F. Vertebrate Dissection. 1970. 4th Ed. W. B. Saunders Co.