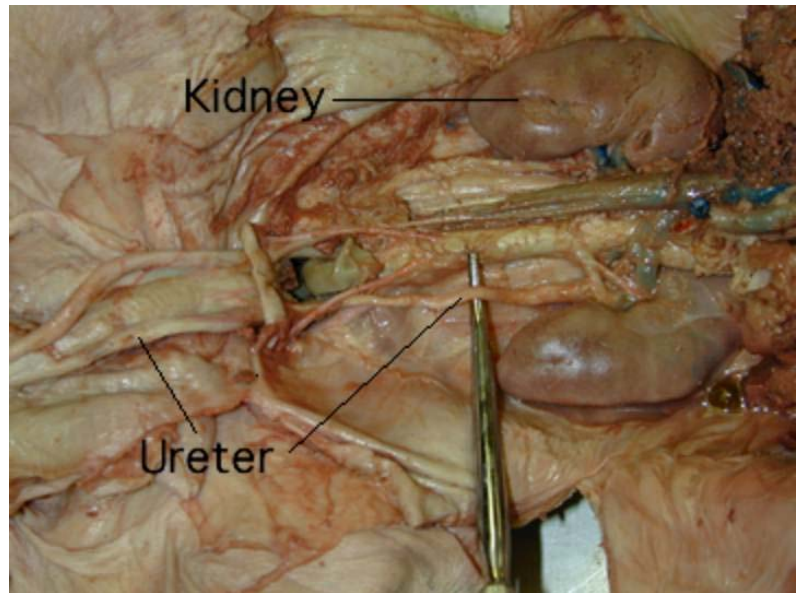


## Laboratory 8 - Urinary and Reproductive Systems

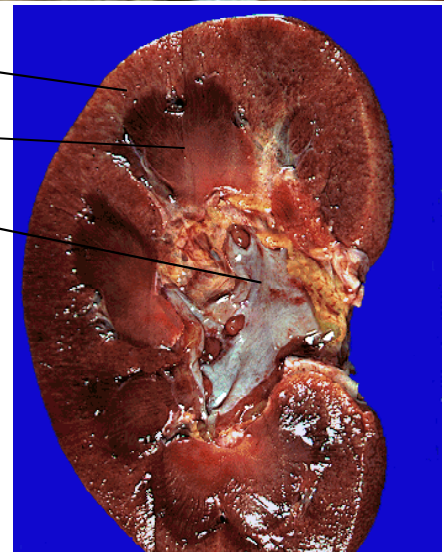
### Urinary System

Please read before starting: It is easy to damage the structures of the reproductive system as you expose structures associated with excretion, so exercise caution as you do this. Please also note that we will have drawings available as well to help you find and identify the structures described below.

The major blood vessels serving the kidneys are the **renal artery** and the **renal vein**, which are located deep in the **parietal peritoneum**. The renal artery is a branch of the dorsal aorta that comes off further caudal than the cranial mesenteric artery.



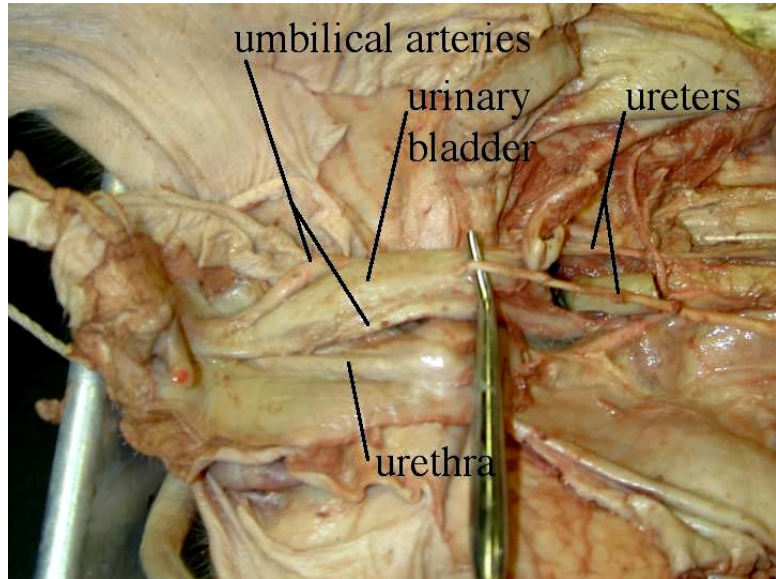
Dissect the left kidney *in situ*, dividing it into dorsal and ventral portions by making a frontal section along the outer periphery. Observe the **renal cortex**  
**renal medulla** (next layer in)  
**renal pyramids**  
**renal pelvis**  
**ureter** (see above diagram)



The kidneys include a variety of structures including an arterial supply, a venous return, extensive capillary networks around each nephron and then, of course, the filtration and reabsorption apparatus. These structures are primarily composed of nephrons (the basic functional unit of the kidney) and the ducts which carry urine away from the nephron (the collecting ducts and larger ducts eventually draining these into the ureters from each kidney). The **renal pyramids** contain the extensions of the nephrons into the renal medulla (the Loops of Henle) and the collecting ducts. Urine is eventually emptied into the **renal pelvis** before leaving the kidneys in the ureters.

The ureters leaves the kidneys medially at approximately the midpoint of the organs and then run caudal to the urinary bladder. The urinary bladder is a longish bag that lies between the **umbilical arteries**.

If you pull on the pig's umbilical cord, you will extend the urinary bladder and make it easier to locate the **urethra**. The urethra leads into the penis in males and into the vagina in females..



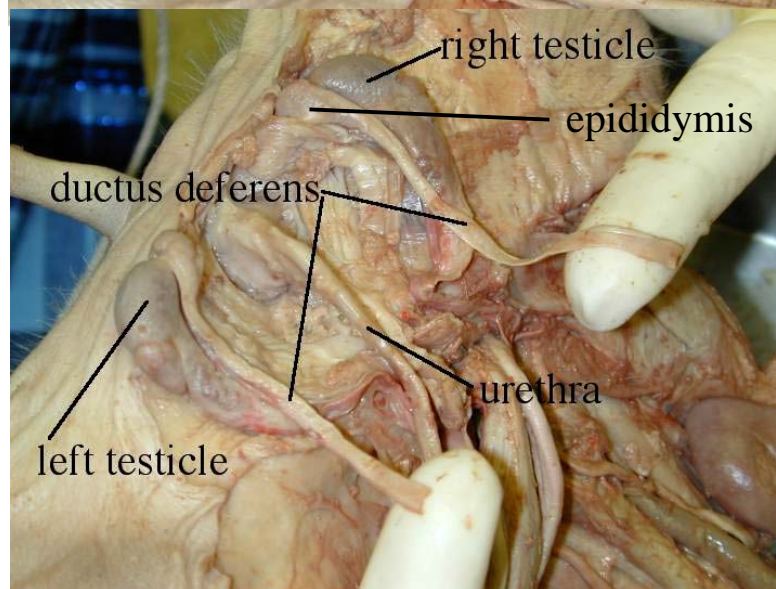
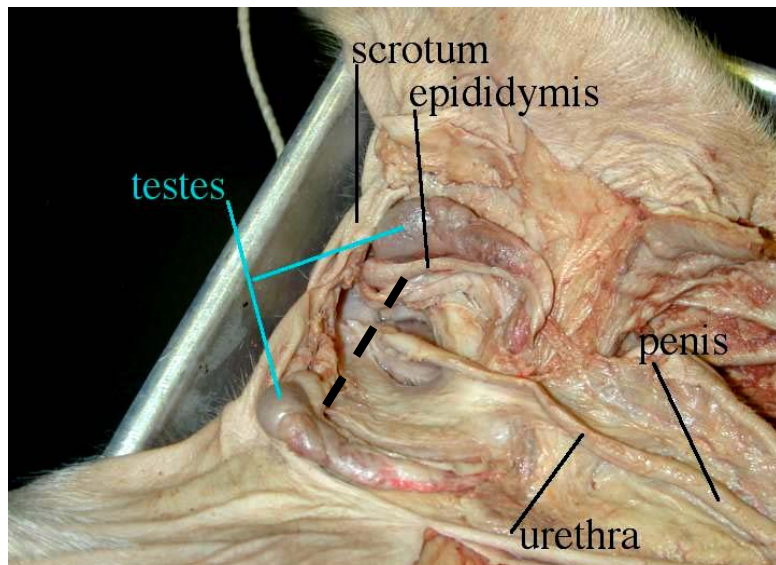
### Male Reproductive

**Anatomy:** If your pig is female, observe these structures in a male pig being dissected by another group.

The two figures to the right show the male reproductive system dissected so that the major structures are visible.

The penis is located in the flap of ventral body wall caudal to the umbilical cord. Make a lengthwise incision using your scissors and beginning at the urogenital opening to expose the penis. Make sure to cut only just below the skin. Once you have done this, you can use the probe from your kit to expose the penis. It will extend towards the back of the animal until meeting the urethra.

Sperm in the adult male will be carried in the **ductus deferentia** (singular: ductus deferens), which extend from the



epididymis and testes then pass over the ureters before entering the urethra. The ductus deferentia extend backwards and toward the exterior of the animal where they pass through the **inguinal canal** and into the **scrotum**. The testis can be exposed by cutting along the inguinal canal (scissors are best for this). Inside the membranes housing the testis, you should also find the connection between the **ductus deferentia** and the **epididymis** .

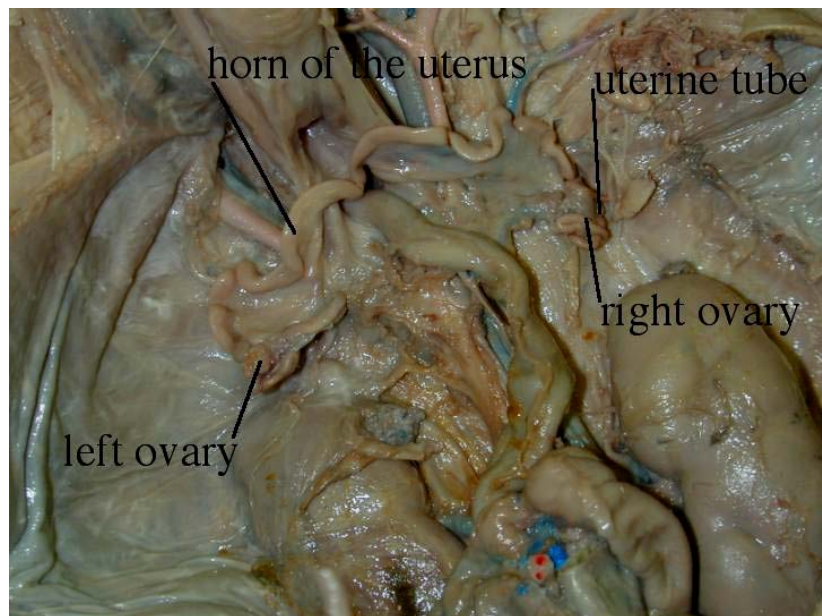
Locate the pubic symphysis, a portion of the pelvic girdle, by probing through the muscle and connective tissue in approximately the location shown in the upper picture above with the dotted line. Using scissors, cut through the bone once you locate it, going from posterior to anterior and being careful to cut only the bone. Press the hind limbs apart and trim the ends of the symphysis with your scissors. This should make the **urethra** visible. Follow the urethra to the **urinary bladder** and you should also see two large **bulbourethral glands** to either side of the urethra near where it meets the penis. These glands are also known as 'Cowper's glands' and help to protect sperm in the acidic environment of the urethra by producing an alkaline fluid.

Pulling on the umbilical cord helps to locate the **seminal vesicles**. These glands are found on the dorsal surface of the urethra very near where the ductus deferentia join the urethra. The **prostate gland** lies between the lobes of the seminal vesicles but will be difficult to identify at this immature stage of development. In adulthood, this gland produces fluid in which the sperm are carried.

*Question: What is the functional reason the testis very often found in an external scrotum in mammals?*

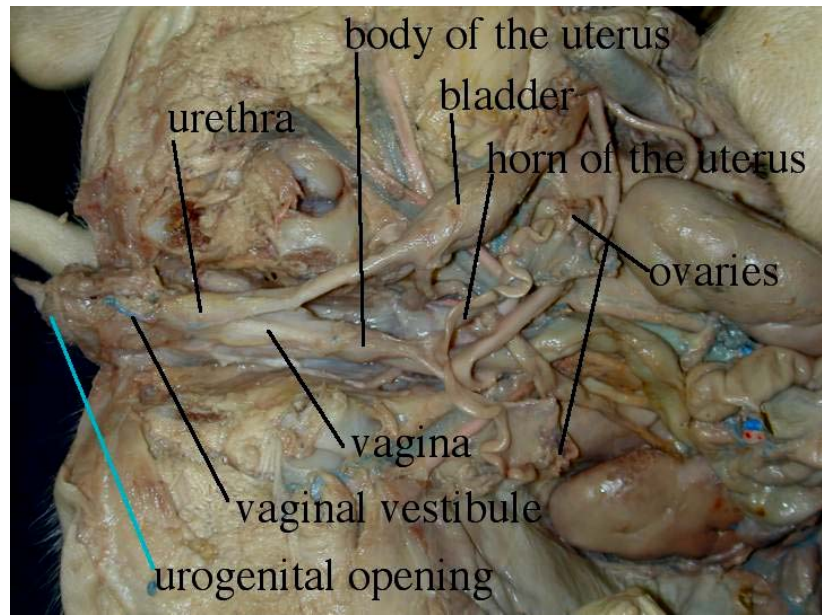
## Female Reproductive Anatomy:

As with the male discussed above, locate the pubic symphysis and trim as with the male. The **ovaries** are found in the abdominal cavity the ends of the **uterine tubes**. The uterine tubes also go by the more familiar names of **oviducts** and **fallopian tubes** and are the usual site of fertilization (see figure to right here).



Moving down from the ovary, the uterine tubes connect to the **horns of the uterus** which connect to the **body of the uterus** (found above the urethra - see figure below).

Continuing to move caudal, the next portion of the uterus is the **cervix**. The cervix leads into the **vagina**. To see the cervix and vagina, dissect the uterus open with a scalpel, then look for a series of internal ridges (present in the cervix, but lacking in the vagina). The next structure leading externally is the **vaginal vestibule**, found where the vagina and urethra meet. The vaginal vestibule leads to the exterior orifice, **urogenital opening**, found below the anus on the exterior of the animal.



### **Pregnant Pig Uterus**

We will have a pregnant pig uterus on demonstration and your T.A. will dissect an embryo from the extraembryonic membranes that support its development. These include the **serosa**, the **allantois** and the **amnion**. The amnion surrounds the developing fetal pig. The allantois is an outpouching of the gut that plays the major role in exchange between the mother and fetus. The serosa is the membrane facing into the lumen of the uterus. Together, the serosa and the allantois form the **chorion**. The chorion forms villi which penetrate into the lining of the uterus (this lining is maternally derived) forming a close relationship and highly vascularized exchange structure. The combined chorion and uterine mucosa in the area of contact are referred to as the **placenta**.