

Name: _____ Period: _____ Date: _____

Ms. Randall Anatomy & Physiology

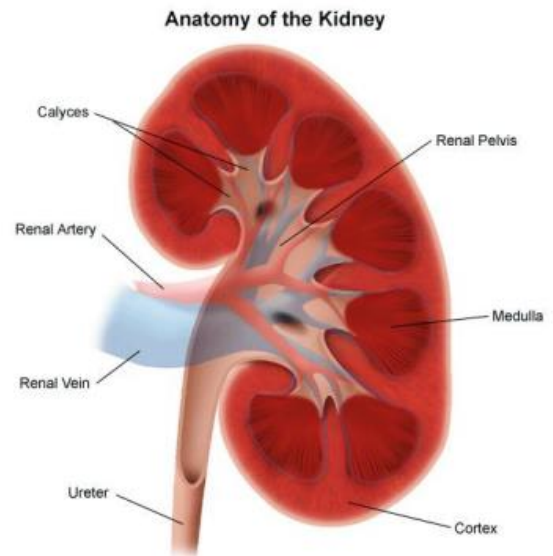
Lab activity: Sheep kidney dissection

Background: The human urinary system consists of two kidneys, two ureters, one urinary bladder, and one urethra. This system has two basic functions, both of which occur in the kidneys. The first function is to remove nitrogenous wastes (such as creatinine, urea, and uric acid) from the body. The second function is to maintain the electrolyte, acid-base, and fluid balances of the blood. One product of these processes is urine, which -- generally -- is a pale yellow fluid containing water, urea, sodium, potassium, phosphate, sulfate ions, creatinine, uric acid, calcium, magnesium, and bicarbonate ions. Urine moves from the kidneys to the urinary bladder in the ureters, which, for the purposes of this lab, are extensions of the renal pelvis. Urine is stored in the urinary bladder until it leaves the body via the urethra.

There are several parts to the kidney, as show at right.

From the outside to the center of the kidney, find each of the following in your specimen:

- The **renal cortex** is the solid looking outermost part of the kidney. It contains many small arteries and veins that carry blood to and from approximately one million **nephrons** located in the cortex
- The **medulla** is the region located inward from the cortex. It includes the cone shaped **renal pyramids**. These are the fibrous or striped triangular zones in the medulla that contain the collecting ducts, which collect urine from the kidney tubules of the nephrons in the cortex. Between the pyramids are the **renal columns** that contain middle-sized arteries and veins that carry blood between the nephrons in the cortex and the renal artery and vein
- The hollow area in the center of the kidney is the **renal pelvis**, which should not be confused with the bone called the pelvis. The collecting ducts drain into the pelvis. From there, the urine passes out through the **ureter** to the **urinary bladder**.

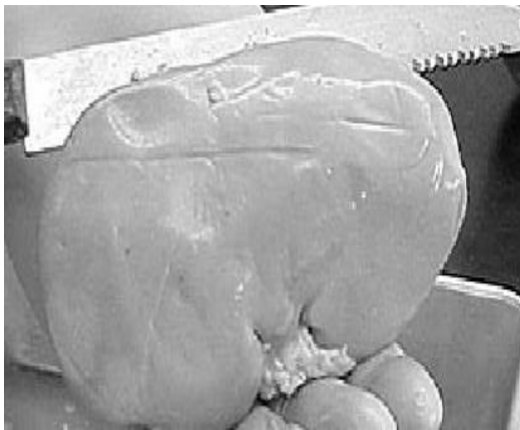
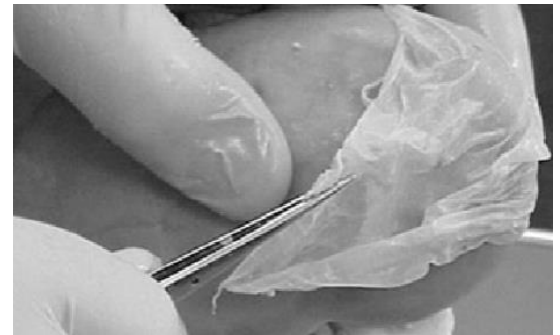
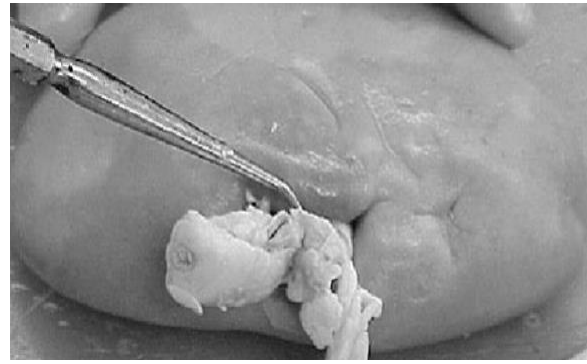


Objective: In this activity, you will examine the outside of a sheep kidney and then cut it open to see and identify the structures inside the kidney, the path taken through the kidney by the blood, and by the filtrate that becomes the urine.

Safety Handle sharp instruments with caution. Always point them and cut away from yourself and anyone else who is nearby. When you have finished, clean all your tools and put them away. Wash your hands with detergent and warm water before leaving the lab.

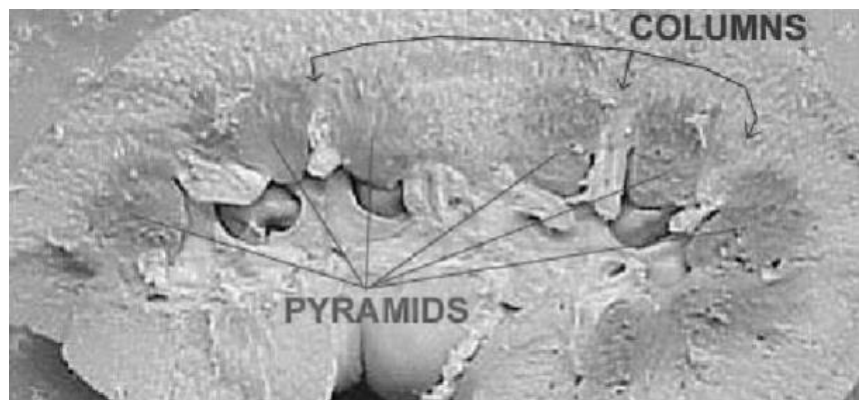
Procedure:

1. Collect your dissecting tools and tray. Obtain a preserved sheep kidney.
2. You should notice adipose tissue (remnants of the adipose capsule) clinging to the renal capsule.
3. You should also notice a “pinched-in” area where the renal blood vessels and ureter are attached to the kidney. This is the renal hilus.
4. Remove the renal capsule.
5. Once the renal capsule is removed, you will be looking at the renal cortex (if you would remove the renal cortex then you would see the renal medulla).
6. Separate the renal blood vessels from one another and from the ureter. Generally, the tube with the most adipose around it is the ureter.
* Notice the histological differences (and similarities) between the renal arteries, renal veins, and ureter.
7. Make a frontal (coronal) section through the kidney. Identify the renal pyramids (and parts of the pyramids), the renal columns, the renal pelvis, renal cortex, ureter and any blood vessels that are present.



8. Identify the following structures:

- calyx (calyces)
- cortex
- hilus
- medulla
- renal columns
- renal papilla renal pelvis
- renal pyramids
- ureter (if present)



Analysis

1. What is the main function of the kidney?
2. Describe the pathway of blood through the kidney.
3. How did you distinguish between the renal artery and the renal vein?
4. Which area of the kidney contains the glomeruli and Bowman's capsules?
5. In which part of the kidney does the majority of water reabsorption occur?
6. What structure carries urine out of the kidney and where does it go?