

Laboratory Objectives

After completing this lab, you should be able to:

1. Identify and describe the functions of structures found in the kidney and to compare the same structures with the human kidney.
3. Identify the renal cortex and the renal medulla using the microscope.

NOTE: *you need to use your Anatomy & Physiology Revealed CD (Version 2.0)*

INTRODUCTION

The urinary system is composed of four (4) organs: the *kidneys*, *ureters*, *urinary bladder*, and *urethra*. However, the kidneys are the primary organs of the urinary system as they filter blood to remove waste molecules, maintain extracellular fluid balance, and maintain the blood pH. The kidneys also have other complex functions that lead to the production of urine.

In this laboratory exercise, you will dissect a sheep kidney to learn the identification and functions of the major structures found in the kidney.

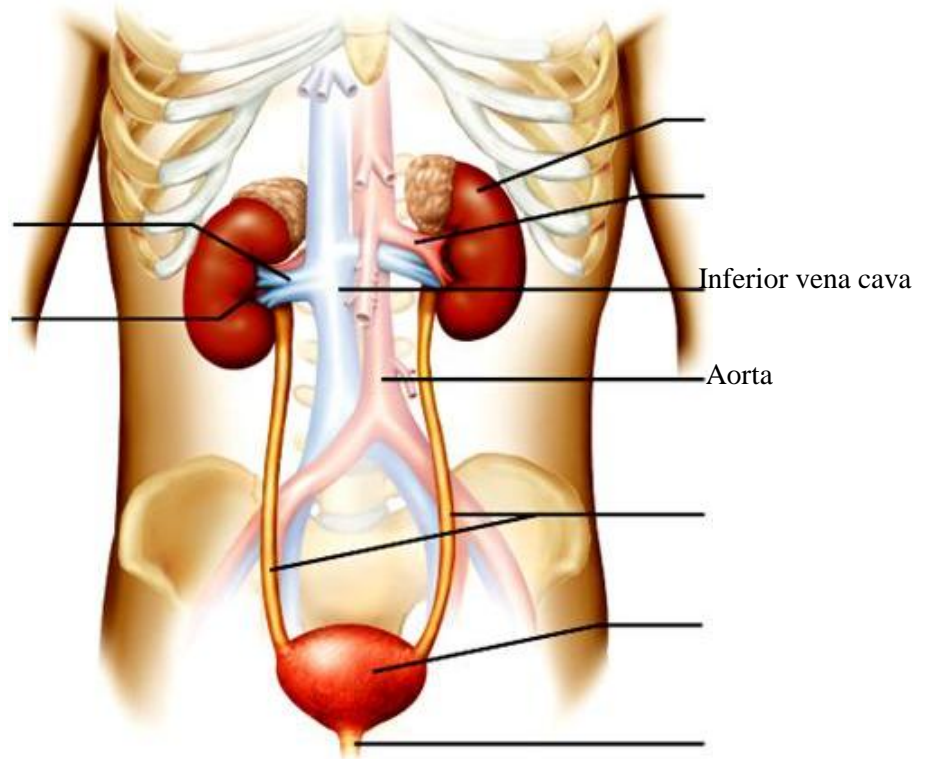
PART 1

Review the Anatomy of the Urinary System

A. Label the organs and parts of the urinary system in the following figure using the terms provided.

Terms:

Renal artery
Renal vein
Kidney
Hilum
Ureters
Urethra
Urinary bladder



B. Label the structures found in the interior of the human kidney using the terms provided.

Terms:

Renal Cortex
Renal Medulla
Minor Calyces
Major Calyces
Renal Pelvis
Ureter



C. Place the most appropriate number in the blank provided.

- | | |
|---------------------------|--|
| _____ cortex | 1. Supports kidneys against back muscles of the abdominal cavity |
| _____ Medulla | 2. Area where the ureter leaves the kidney |
| _____ Capillary network | 3. Inner region of kidney |
| _____ Hilum | 4. Collect urine |
| _____ Parietal peritoneum | 5. Outer layer of kidney |
| _____ Calyx | 6. Glomerulus |

D. Describe the **FUNCTIONS** of the following structures:

1. Minor Calyx: _____

2. Major Calyx: _____

3. Renal Pelvis: _____

E. Answer the following questions:

1. What part or parts of the nephron are found in the renal cortex? _____

2. What part or parts of the nephron are found in the renal medulla? _____

3. Are there collecting ducts in both, renal cortex and renal medulla? Yes No

Calyx = singular
Calyces = plural

PART 2

Microscopic Examination of the Kidney

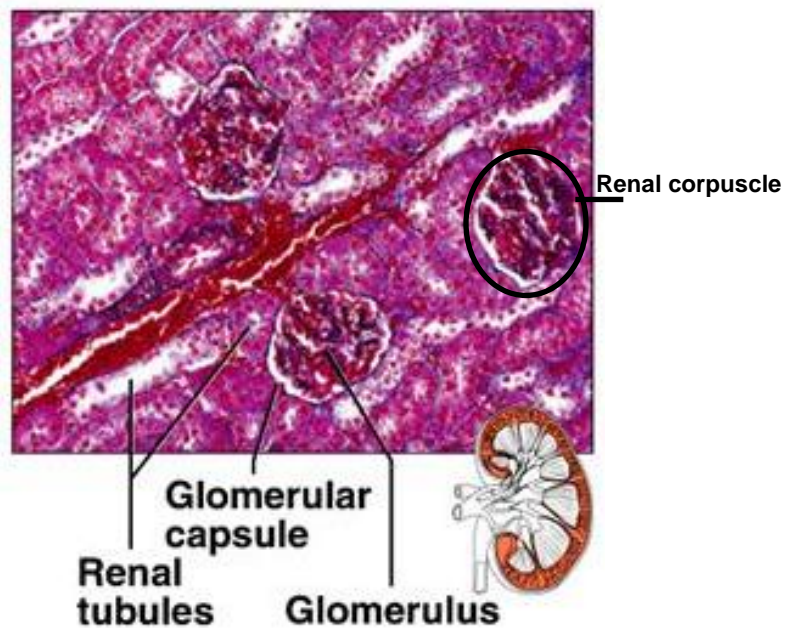
Renal Cortex

A. View the renal cortex in the microscope that is set up in the laboratory.

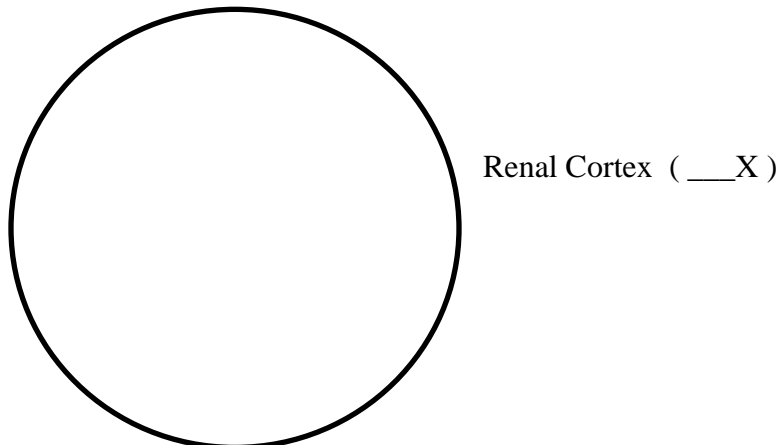
Locate the *renal corpuscles* that are easily identifiable as dark circles and also locate the following features (See Figure 1):

- Glomerulus*: is the dark region forming the center of the renal corpuscle. It is a network of glomerular capillaries.
- Glomerular Capsule* or *Bowman's Capsule*: thin white or light area surrounding the glomerulus.
- Renal Tubules*: the tissue surrounding each renal corpuscle is composed mainly of renal tubules.

Fig. 1: Renal Cortex



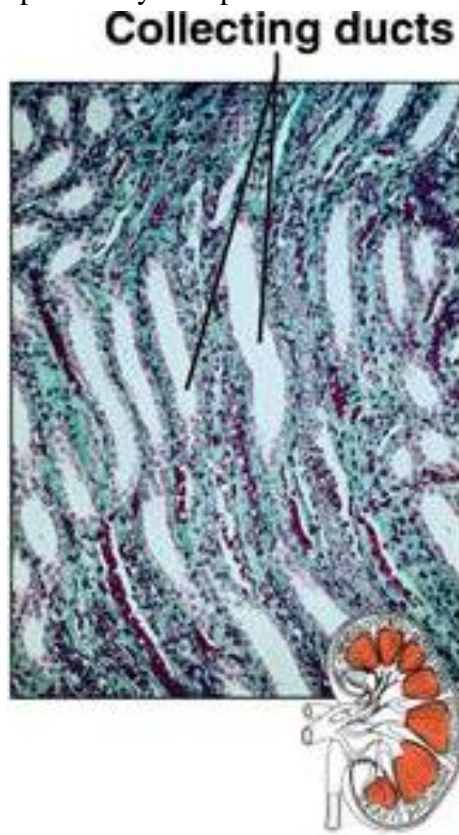
B. Sketch a representative section of the renal cortex **AND** label: renal corpuscle, glomerulus, glomerular capsule, renal tubules.



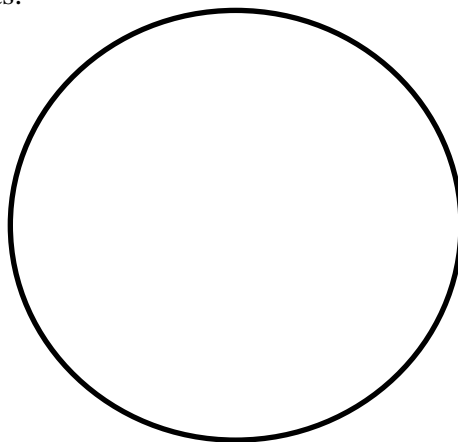
Renal Medulla

A. Locate the renal tubules and *collecting ducts* found in the renal medulla (see Figure 8.2) using the microscope already set up with the cross section of the kidney slide.

Fig. 2: Renal Medulla



B. Sketch a representative section of the renal medulla **AND** label: renal tubules and collecting ducts.



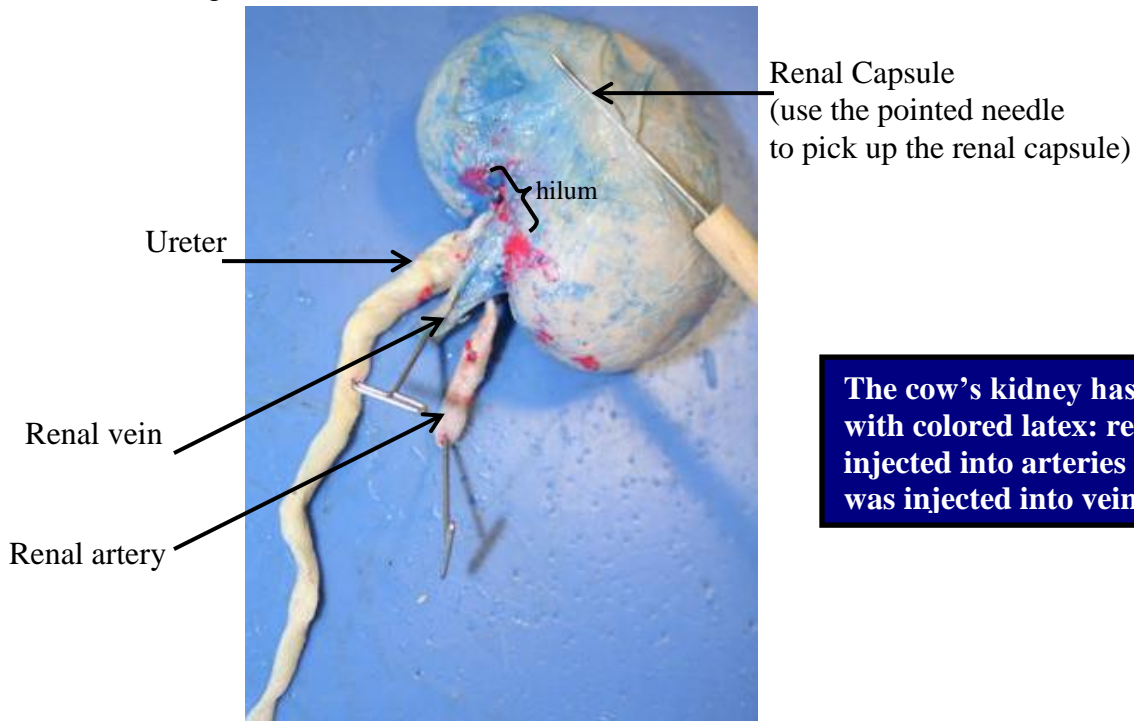
Renal Medulla (___X)

Dissection of The Sheep's Kidney

PART 1

The Cow's Kidney

A. Obtain a cow's kidney and place it on the dissecting tray. Observe the following using the next figure:



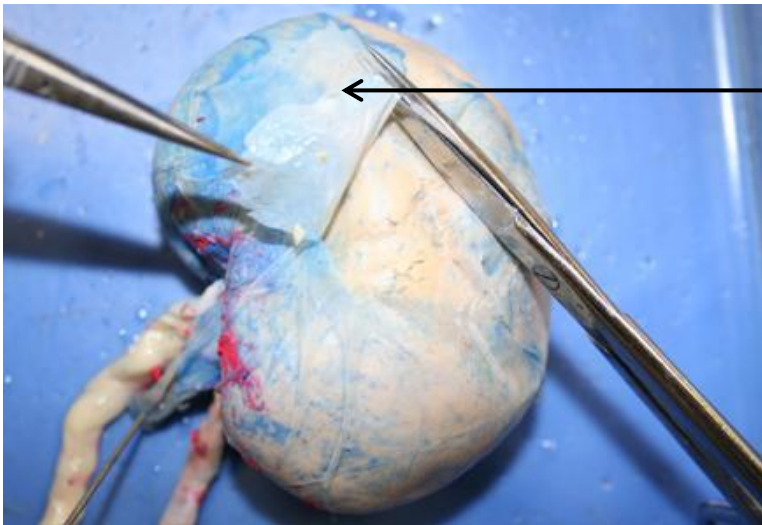
The cow's kidney has been injected with colored latex: red latex was injected into arteries and blue latex was injected into veins.

B. Answer the following questions:

1. Describe the function of the renal capsule: _____

2. What type of tissues make up the renal capsule? _____

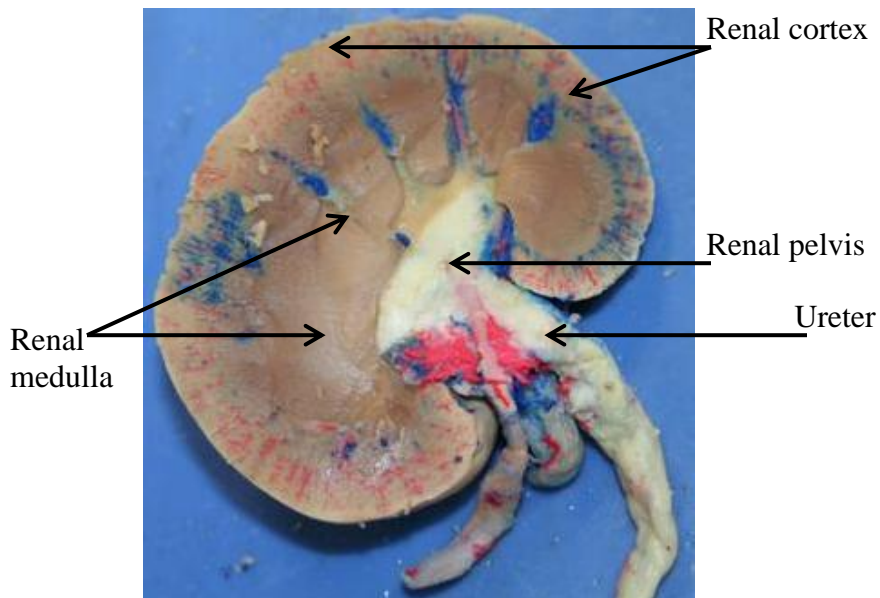
C. Remove the renal capsule using your scissors (see figure below). Notice that the renal capsule attaches at the hilum. Once you have removed completely the renal capsule, pull it with your hands. Is this membrane easy to break? Strong?



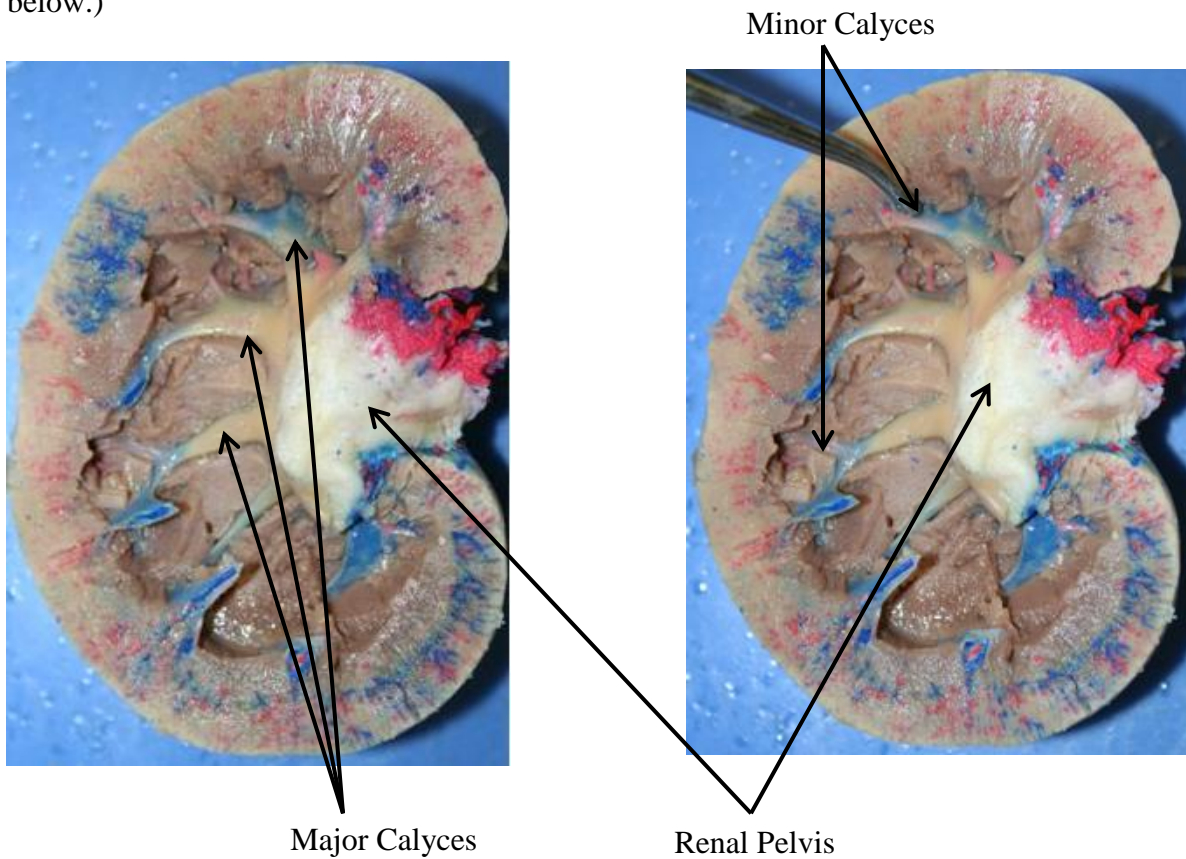
Renal capsule being removed using a scissor.

D. Use your scalpel. Starting at the hilum, cut the kidney in half longitudinally along the coronal plane. The kidney will be divided roughly into equal anterior and posterior portions.

E. Identify the following parts in the interior of the cow's kidney:



F. Remove parts of the renal medulla to see the major and minor calyces (See figures below.)



Calyx = singular
Calyces = plural

G. Now trace the path of urine from its formation at the nephron to where it exits the body at the urethra.