

Lab 8: The Urinary System

Pre-Lab Activities for Exercise 8

8.1 Identify the Major Organs of the Urinary System

Using the image below, label the major anatomical structures of the urinary system.

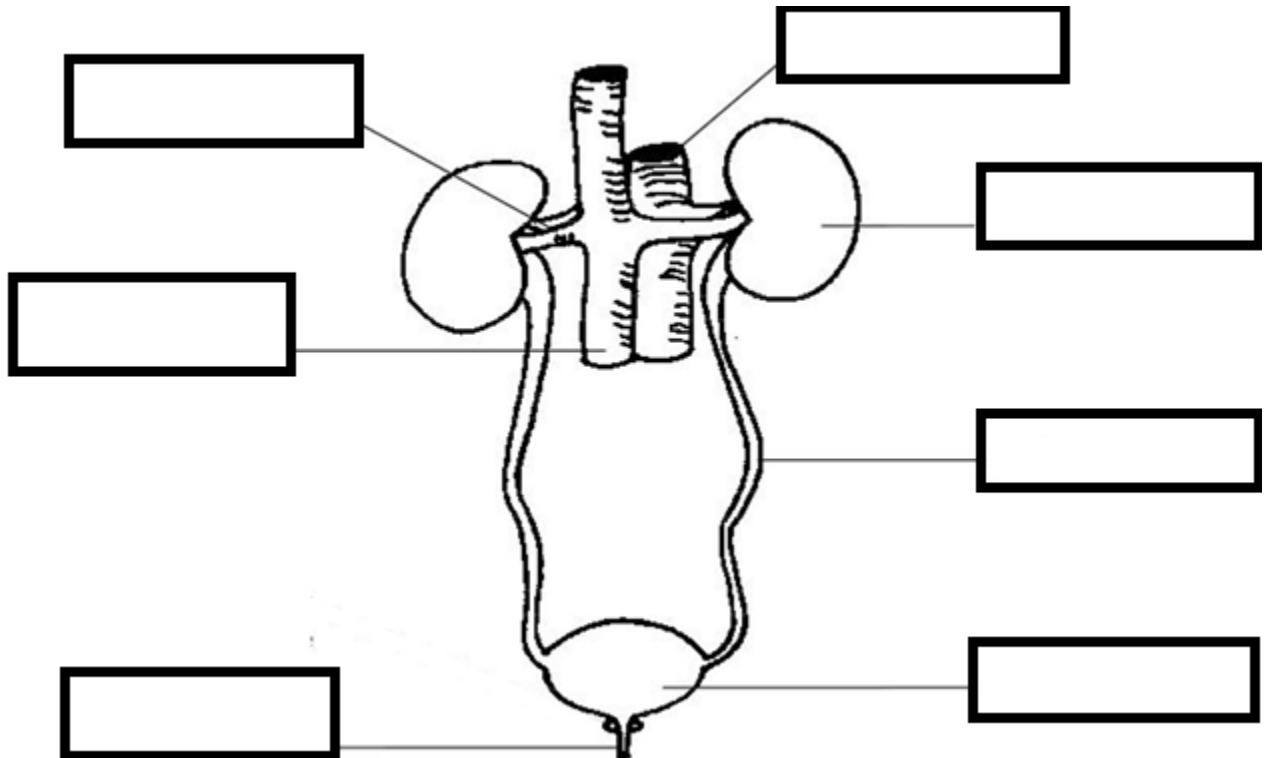


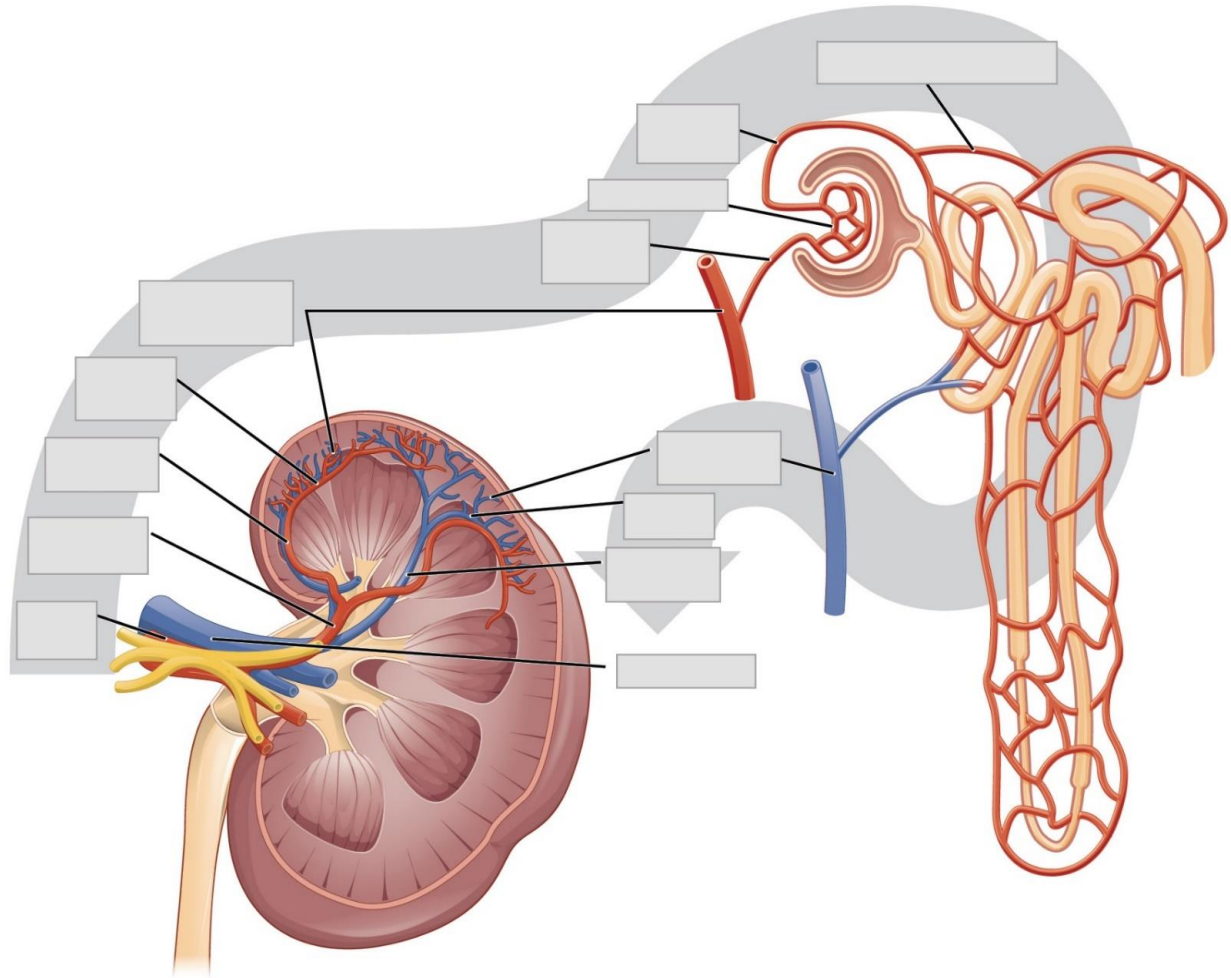
Figure 8.1 Major Structures of the Urinary System

- 1) Which organ(s) are responsible for **PRODUCING** urine?
- 2) Which structures/organs are responsible for **STORING** urine?
- 3) Why do the kidneys receive such direct and major blood flow to/from them?
How does their location relative to major blood vessels of the abdomen relate to their function?

8.2 Blood Flow in the Kidney

Use the following terms to label the diagram below: peritubular capillaries, renal artery, segmental artery, renal vein, interlobar artery, interlobar vein, arcuate vein, arcuate artery, cortical artery, cortical vein, afferent arteriole, glomerulus, and efferent arteriole.

Figure 8.2 Blood Flow to the Kidneys. The figure depicts a kidney and nephron with boxes pointing to structures to label.



- 1) Where in the kidney are the parts of a nephron found?
- 2) What are the two distinct types of nephrons? What is different about them?

8.3 Terms Associated with the Urinary System

Use your required textbook to complete the table below.

Structure	Definition
Nephron	
Renal cortex	
Renal medulla	
Glomerulus	
Renal corpuscle	
Proximal tubule	
Distal tubule	
Nephron loop	
Renal pelvis	
Cortical nephron	
Juxtamedullary nephron	
Juxtaglomerular apparatus	

Table 8.1: Urinary Terms

ABAC Anatomy and Physiology II Lab Manual 2nd Edition © 2023 by Heather Cathcart, Gina Profetto, Amber Howard, Ariel Hunt, Kingsley Dunkley, Jenny Harper, and Richard (Tony) Matthews is licensed under [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/)
<https://openstax.org/details/books/anatomy-and-physiology>

Lab Exercise 8: Urinary Anatomy

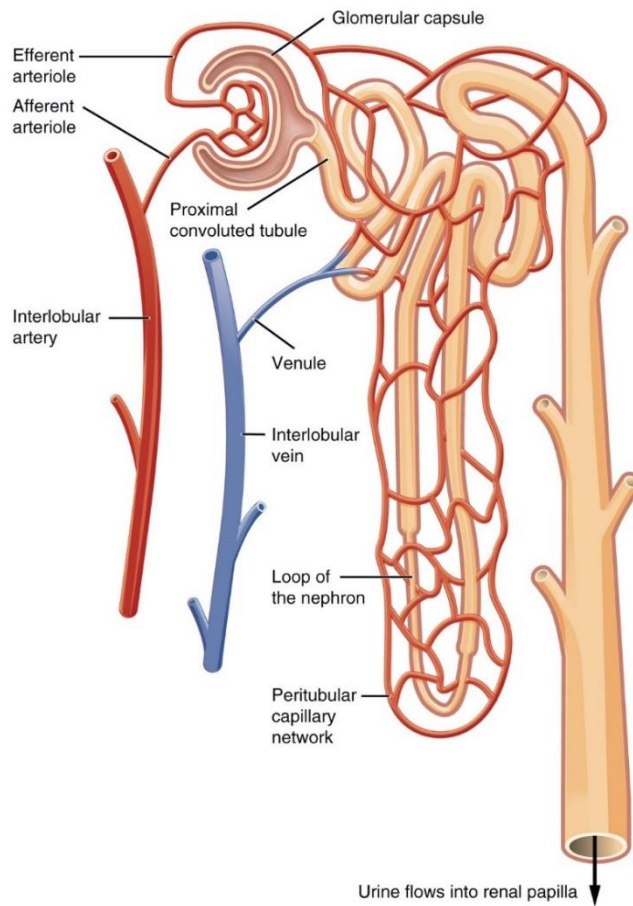


Figure 8.6 Blood Vessels Surrounding an Individual Nephron.

ABAC Anatomy and Physiology II Lab Manual 2nd Edition © 2023 by Heather Cathcart, Gina Profetto, Amber Howard, Ariel Hunt, Kingsley Dunkley, Jenny Harper, and Richard (Tony) Matthews is licensed under [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/)
<https://openstax.org/details/books/anatomy-and-physiology>

- What substances are secreted/absorbed in the various parts of the nephron?

Lab Activity 8.1: Identify Urinary Structures

Using a torso or kidney model identify the following structures:

- | | |
|----------------------------------------------------------|----------------------------------------------------------|
| <input type="checkbox"/> Adrenal glands (right and left) | <input type="checkbox"/> Renal pelvis |
| <input type="checkbox"/> Urinary bladder | <input type="checkbox"/> Renal pyramid |
| <input type="checkbox"/> Kidneys (right and left) | <input type="checkbox"/> Renal calyces (major and minor) |
| <input type="checkbox"/> Renal artery (right and left) | <input type="checkbox"/> Renal column |
| <input type="checkbox"/> Renal vein (right and left) | <input type="checkbox"/> Renal cortex |
| <input type="checkbox"/> Ureters (right and left) | <input type="checkbox"/> Renal medulla |
| <input type="checkbox"/> Urethra | <input type="checkbox"/> Renal papillae |

ABAC Anatomy and Physiology II Lab Manual 2nd Edition © 2023 by Heather Cathcart, Gina Profetto, Amber Howard, Ariel Hunt, Kingsley Dunkley, Jenny Harper, and Richard (Tony) Matthews is licensed under [CC BY 4.0](https://openstax.org/details/books/anatomy-and-physiology)
<https://openstax.org/details/books/anatomy-and-physiology>

Post-Lab 8 Review

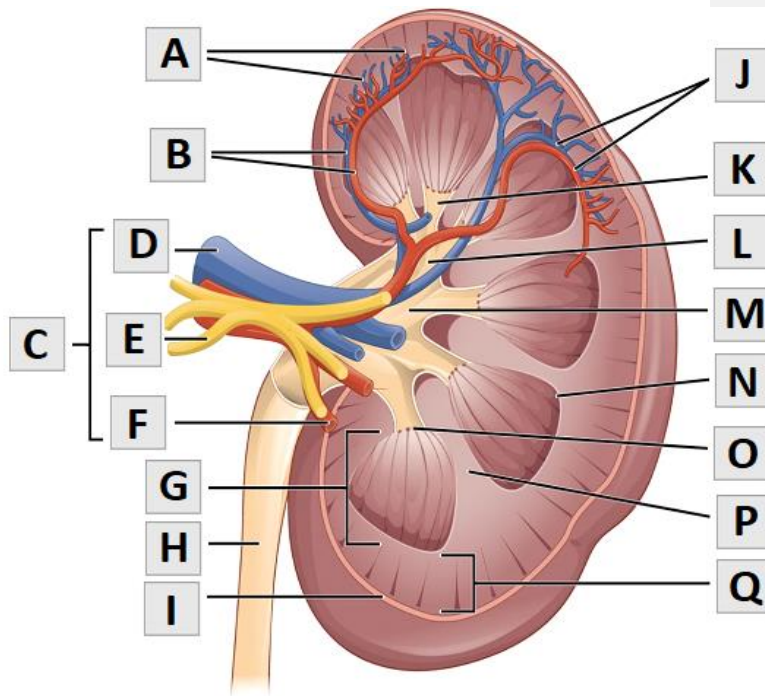
Post-Lab Activity 8.1: Review Questions

1. What is the function of the renal capsule?
2. Which structure is continuous with the renal pelvis that transports waste from the kidneys to the bladder?
3. What is the structural importance of the renal hilum?
4. What is the difference between calyces and papillae?
5. Where in the kidneys are nephrons present?
6. What are the two parts of a nephron?

Post-Lab Activity 8.2: Fill in the Table for the Internal Kidney Structure

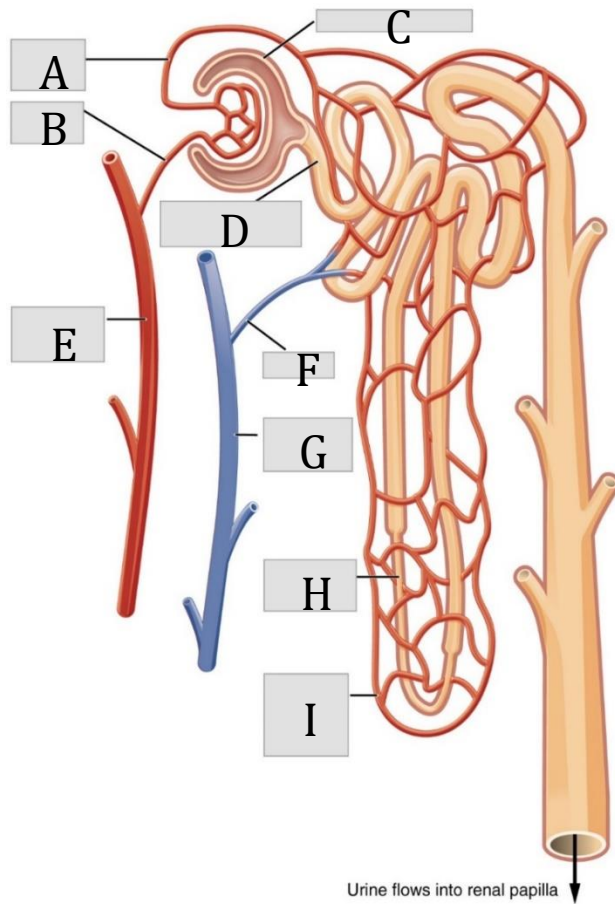
Figure 8.10 Label the Major Structures of the Kidney

Structure	Letter
Renal Artery	
Renal Vein	
Renal Medulla	
Renal Cortex	
Renal Capsule	
Renal Pelvis	
Interlobar Vessels	
Renal Hilum	
Pyramid	
Cortical Vessels	
Renal Column	
Arcuate Vessels	
Ureter	
Major Calyx	
Minor Calyx	
Papilla	
Renal Nerve	



Post-Lab Activity 8.3: Label Structures Associated with Blood Flow in the Nephron

Figure 8.11 Label the Major Structures of the Nephron



Name of Structure Indicated

A.

B.

C.

D.

E.

F.

G.

H.

I.

ABAC Anatomy and Physiology II Lab Manual 2nd Edition © 2023 by Heather Cathcart, Gina Profetto, Amber Howard, Ariel Hunt, Kingsley Dunkley, Jenny Harper, and Richard (Tony) Matthews is licensed under [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/)
<https://openstax.org/details/books/anatomy-and-physiology>

Post-Lab Activity 8.4: Urinalysis

- What urinalysis results would you expect for someone being treated for a bacterial infection?
 - Color:
 - pH:
 - Specific gravity:
 - Glucose:
 - Protein:
- What urinalysis results would you expect for someone being treated for diabetes mellitus?
 - Color:
 - pH:

- c. Specific gravity:
- d. Glucose:
- e. Protein:

Post-Lab Activity 8.5: Label the Kidney

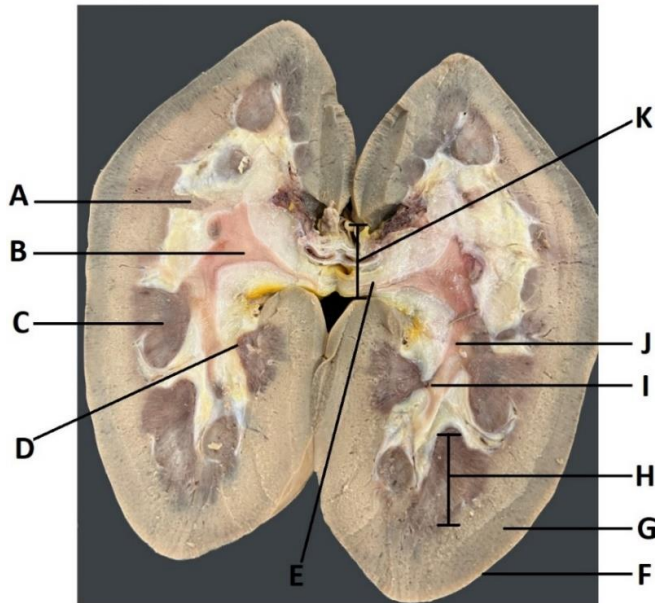


Figure 8.12 Kidney Dissection Photograph by Heather Cathcart. Figure shows a kidney cut equally into two halves, with structures labeled A-K.

ABAC Anatomy and Physiology II Lab Manual 2nd Edition © 2023 by Heather Cathcart, Gina Profetto, Amber Howard, Ariel Hunt, Kingsley Dunkley, Jenny Harper, and Richard (Tony) Matthews is licensed under [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/)
<https://openstax.org/details/books/anatomy-and-physiology>

Identify the following structures on the kidney image above.

STRUCTURE	LETTER
Renal Hilum	
Renal Pelvis	
Ureter	
Pyramid	
Major Calyx	
Minor Calyx	
Renal Medulla	
Renal Capsule	
Papilla	
Renal Cortex	
Renal Column	

Post-Lab Activity 8.6: Histology

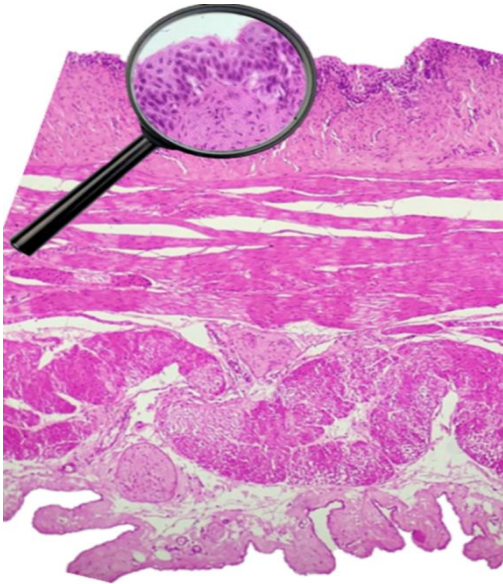


Figure 8.13 Histology of the contracted bladder.

ABAC Anatomy and Physiology II Lab Manual 2nd Edition © 2023 by Heather Cathcart, Gina Profetto, Amber Howard, Ariel Hunt, Kingsley Dunkley, Jenny Harper, and Richard (Tony) Matthews is licensed under [CC BY 4.0](https://openstax.org/details/books/anatomy-and-physiology)
<https://openstax.org/details/books/anatomy-and-physiology>

1. Identify the epithelial tissue on the image of the contracted bladder above.
 - What type of **epithelium** is found in the bladder?
2. In the image, identify the **Bowman's capsule**.
 - What structure is located within this capsule?

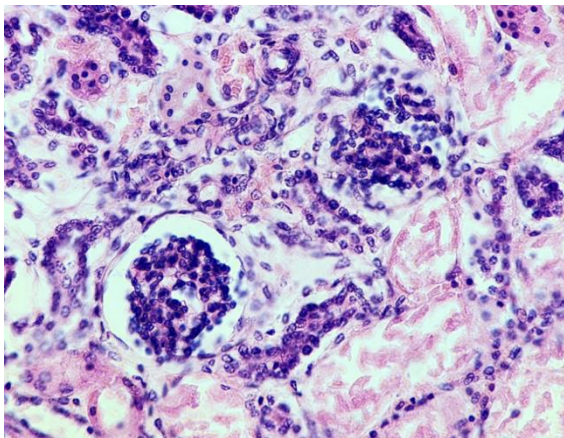


Figure 8.14: Histology of the kidney. Photograph by Gina Profetto.

ABAC Anatomy and Physiology II Lab Manual 2nd Edition © 2023 by Heather Cathcart, Gina Profetto, Amber Howard, Ariel Hunt, Kingsley Dunkley, Jenny Harper, and Richard (Tony) Matthews is licensed under [CC BY 4.0](https://openstax.org/details/books/anatomy-and-physiology)
<https://openstax.org/details/books/anatomy-and-physiology>