

Al-Mustaqbal University College  
Department of Pharmacy  
First Stage  
Medical Terminology  
Lecture: 6



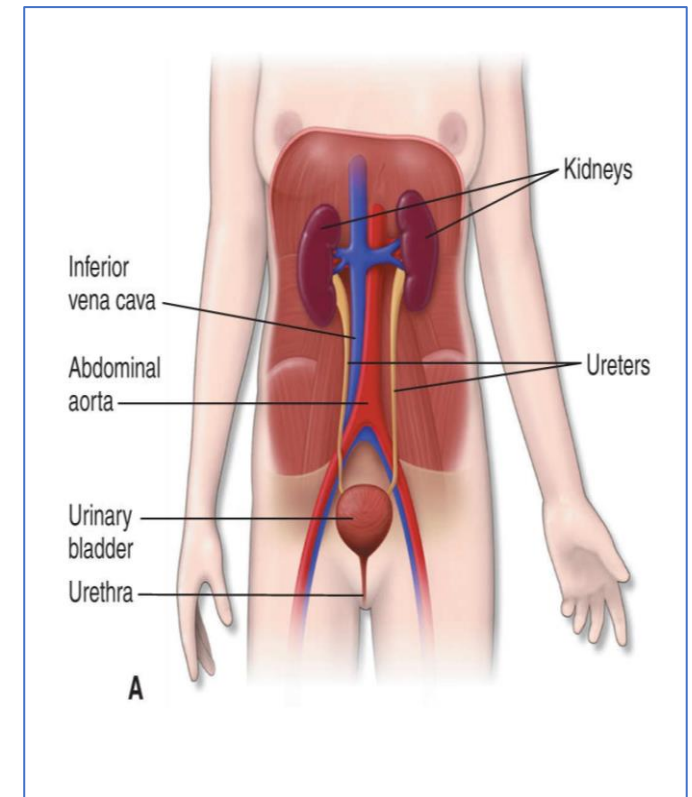
# URINARY SYSTEM

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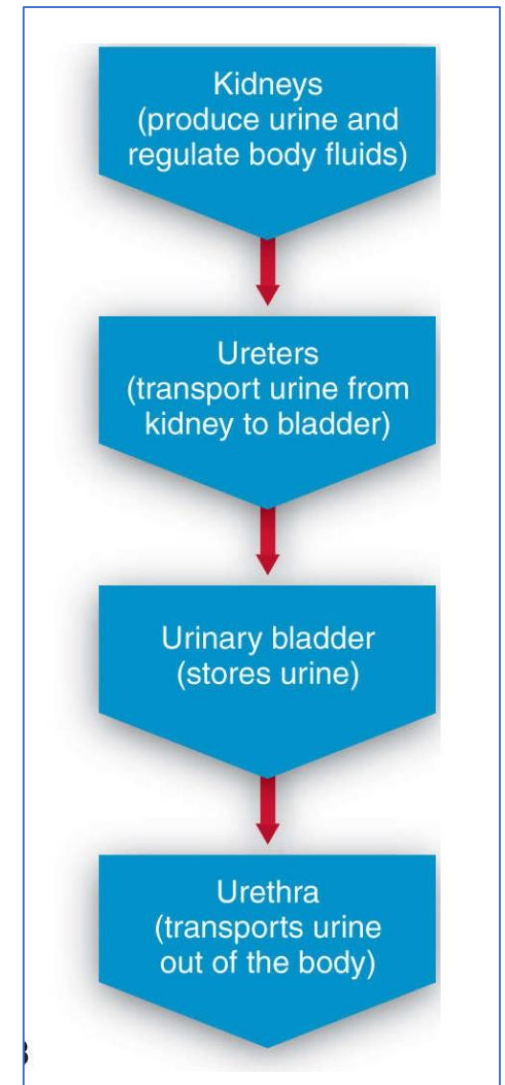
# URINARY SYSTEM

- The **urinary system** is composed of the **kidneys**, **ureters**, **urinary bladder**, and **urethra**.
- These organs are responsible for the **formation**, **storage**, and **removal** of urine.
- These processes **start** with the **kidneys**, paired structures that **remove wastes** from the bloodstream, and **reclaim important electrolytes** like sodium and potassium.
- Help **regulate** blood pressure and fluid balance, and aid in red blood cell production.



# URINARY SYSTEM

- The **kidneys** then form **urine**, which is a fluid containing water and dissolved substances.
- The **ureters** are tubular structures that **transport** urine from the kidneys to the **urinary bladder**, an organ that **stores urine**.
- The **urine** is then **eliminated** through the **urethra**, a canal leading from the urinary bladder to the **exterior**.
- This process **regulates** the amount of **water** in the body and maintains the proper **balance of acids and electrolytes**, which is necessary for human survival.



# RELATED WORD PARTS

**Nephr/o** and **ren/o** are both **root** words that mean **kidney**.

The term **cyst** and the word part **cyst/o** mean **bladder**.

Whereas the word parts **ur/o** and **urin/o** mean **urine**.

# RELATED WORD PARTS

<b>Word Part</b>	<b>Meaning</b>
<b>cyst/o</b>	<b>bladder</b>
<b>glomerul/o</b>	<b>glomerulus</b>
<b>-iasis</b>	<b>condition, state</b>
<b>lith/o</b>	<b>stone</b>
<b>nephr/o, ren/o</b>	<b>kidney</b>
<b>noct/o</b>	<b>night</b>
<b>olig/o</b>	<b>few, little</b>
<b>poly-</b>	<b>much, many</b>
<b>py/o</b>	<b>pus</b>
<b>pyel/o</b>	<b>pelvis</b>
<b>ur/o, urin/o</b>	<b>urine</b>
<b>ureter/o</b>	<b>ureter</b>
<b>urethr/o</b>	<b>urethra</b>

# URINARY SYSTEM

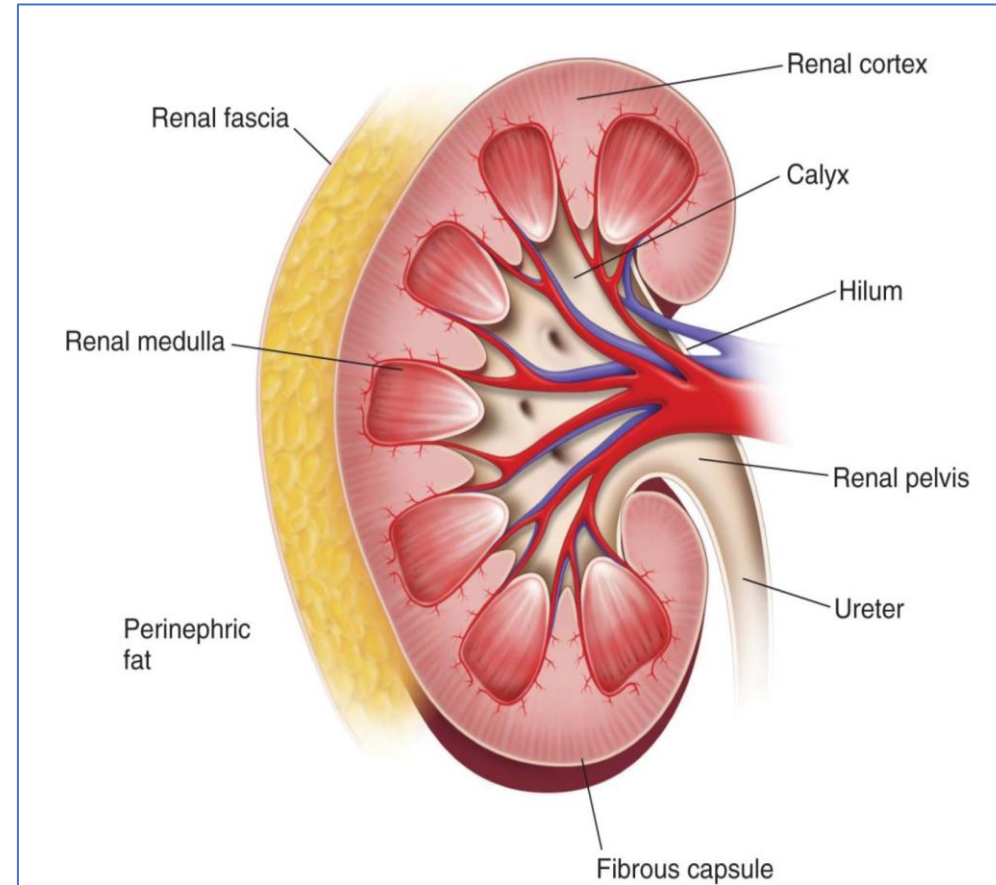
## Word Parts Exercise

After studying Table 14-1, write the meaning of each of the word parts.

WORD PART	MEANING
1. ur/o, urin/o	1. _____
2. noct/o	2. _____
3. olig/o	3. _____
4. -iasis	4. _____
5. glomerul/o	5. _____

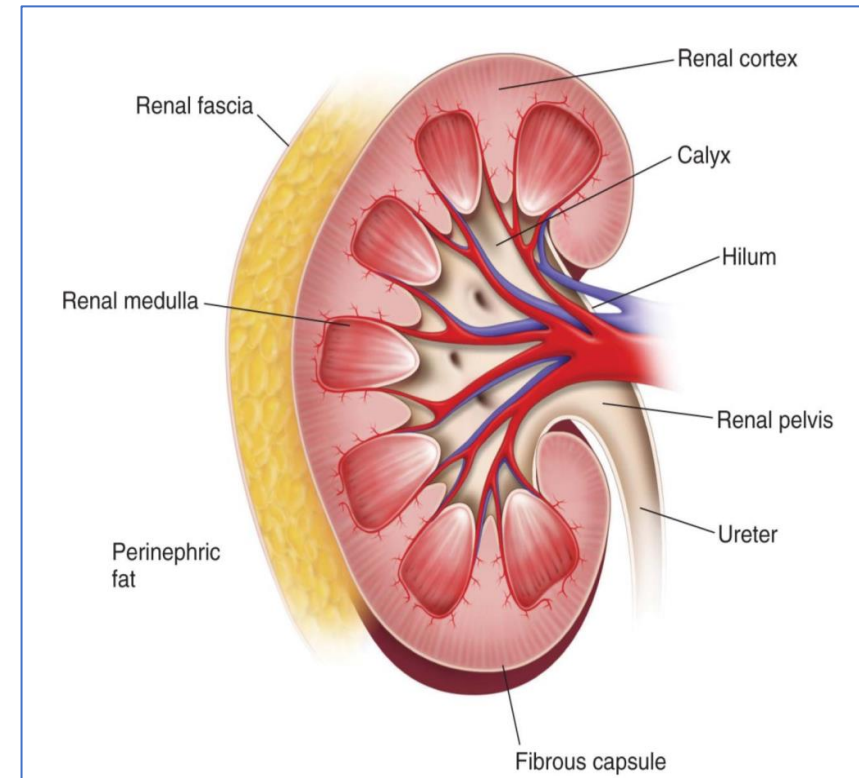
# STRUCTURES AND FUNCTIONS

- The **kidneys** are **bean-shaped** organs and are about the size of a **fist**.
- They lie **retroperitoneally**, which is posterior to the peritoneum, along each side of the **spinal column**.
- Each kidney is **covered** by a thin membrane called the **fibrous capsule**.
- A **thicker layer** of fatty tissue, called the **perinephric fat** or **pararenal fat body**, that provides **protection** for this vital organ.
- Finally, a **thin** layer of connective tissue, called the **renal fascia**, forms each kidney's outer covering.



# STRUCTURES AND FUNCTIONS

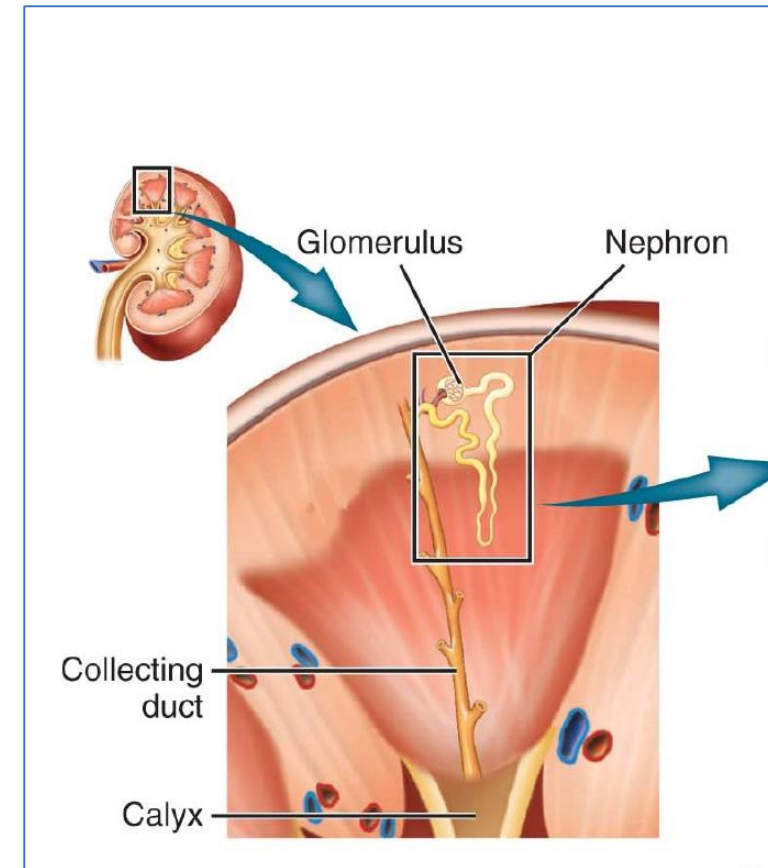
- The **two regions** of the kidney are the outer renal **cortex** and the inner renal **medulla**.
- The **hilum** is the indented and **narrowest** part of the kidney, where **blood vessels** and **nerves** enter and leave.
- The flattened **funnel-shaped** expansion of the upper end of the ureter where urine collects in the kidney is called the **renal pelvis**.
- The **cup-like** structure that drains into the renal pelvis is the **calyx**.





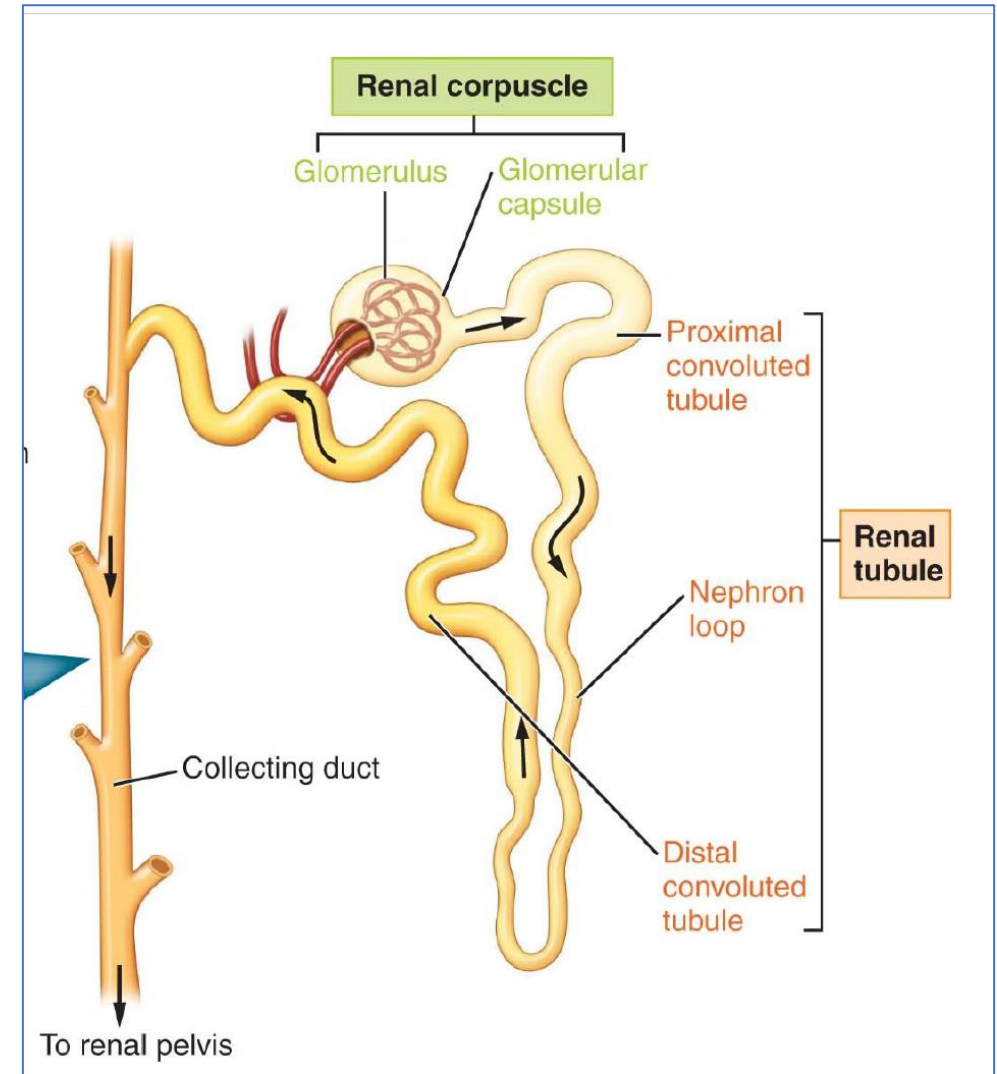
# STRUCTURES AND FUNCTIONS

- The kidneys **form urine** and **remove** two natural products of metabolism, **urea and uric acid**, along with **other wastes** from the blood.
- The kidneys also **filter, reabsorb,** and **secrete** non-waste products **back into the bloodstream.**
- Filtration and production of urine **begin** in the **nephrons**, which are the functional units of the kidneys.
- Each kidney has approximately **1 million nephrons**, and each nephron consists of a **renal corpuscle** and the **renal tubule.**



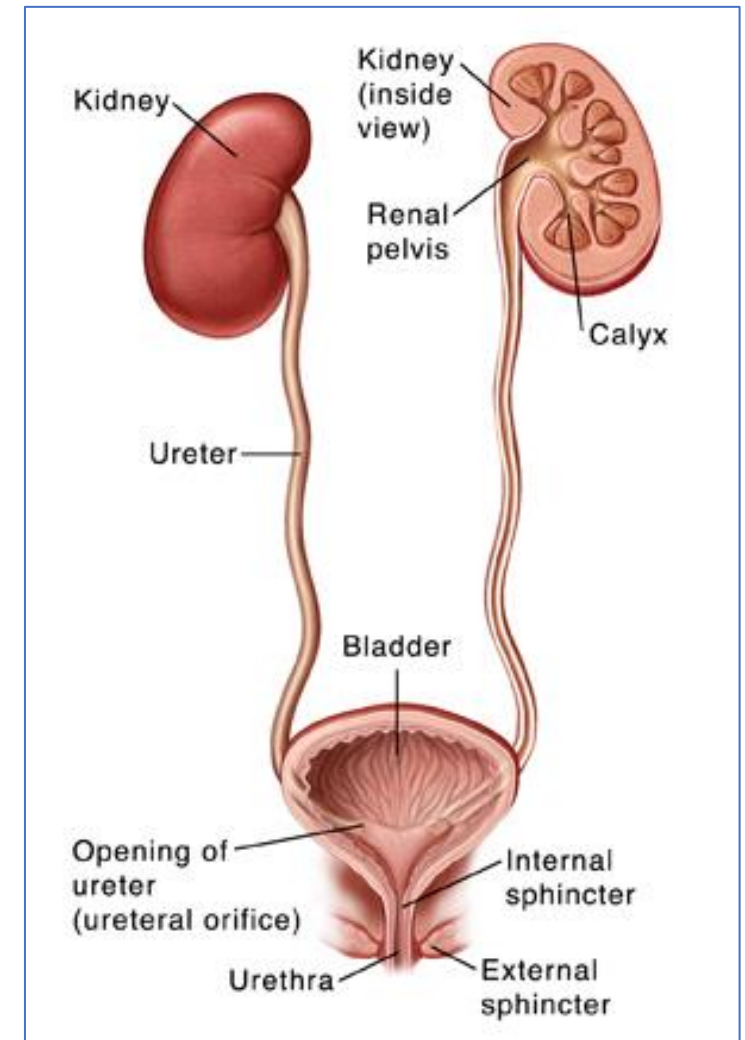
# STRUCTURES AND FUNCTIONS

- The **renal corpuscle** is a structure composed of the **glomerulus** and the **glomerular (Bowman's) capsule**.
- The **glomerulus** consists of a cluster of **capillaries** through which blood and wastes are **filtered**.
- The **renal tubule** consists of the **proximal convoluted tubule**, the **nephron loop (loop of Henle)**, and the **distal convoluted tubule**.



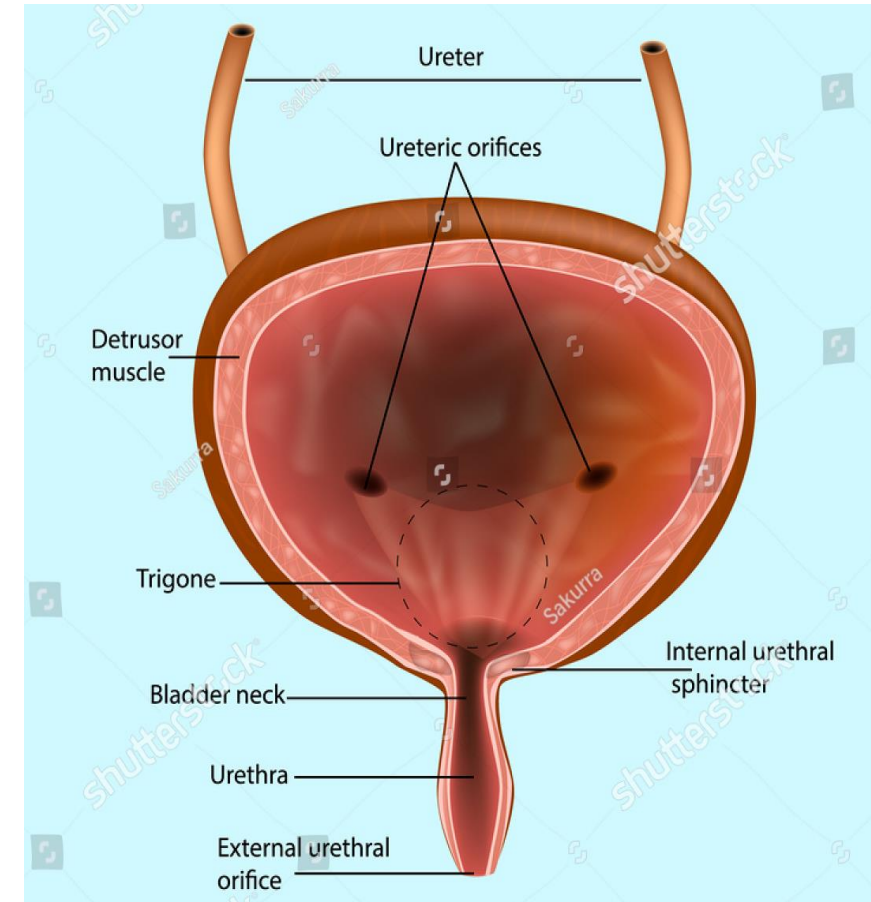
# STRUCTURES AND FUNCTIONS

- Fluid **not returned** to the bloodstream becomes **urine**, is collected in the **collecting duct** and moves into the **renal pelvis** before ultimately entering the **ureter**.
- The **ureters** carry the urine to the **urinary bladder**, where it is **stored**.
- The **urinary bladder** stores the urine until a sufficient **volume** causes an **increase in pressure** and triggers the urge to urinate via the **micturition reflex**.



# MICTURITION REFLEX

- **Micturition** is also called **urination, uresis, or voiding**.
- Urination is **regulated** by **two sphincters**, the circular muscles that surround the **urethra**:
- The **internal urethral sphincter**, which is located at the **entrance** to the urethra and is **involuntarily** controlled.
- The **external urethral sphincter**, which is located at the **distal end** of the urethra and is under **voluntary control**.
- The **micturition reflex** is a **contraction** of the **walls** of the urinary bladder and **relaxation** of the urethral **sphincter** in response to the **rise in urinary bladder pressure**.





## Quick Check

### Fill in the blanks.

1. Name the primary organs of the urinary system.

\_\_\_\_\_, \_\_\_\_\_,  
\_\_\_\_\_

2. The indented part of the kidney, where blood vessels and nerves enter or exit, is called the \_\_\_\_\_.

3. Name the two urethral sphincters.

# DISORDERS RELATED TO THE URINARY SYSTEM

- **Dysuria:** painful, difficult urination, **Incontinence:** the loss of urinary control, **Retention:** the inability to empty the bladder
- **Urinary tract infections (UTIs):** infections of the urinary tract such as Cystitis, Glomerulonephritis, Nephritis, Pyelonephritis, and Urethritis
- **Cystitis:** inflammation of the urinary **bladder**, usually caused by infection.
- **Glomerulonephritis:** inflammation of the **glomerulus**, which can involve one or both kidneys, usually caused by infection.
- **Nephritis:** inflammation of the kidney(s), usually caused by infection
- **Pyelonephritis:** inflammation of the **calyces** and renal **pelvis**, typically due to bacterial infection
- **Urethritis:** inflammation of the **urethra**, usually caused by infection.

# TESTS, TREATMENTS, AND SURGICAL PROCEDURES

- Examples include **cystalgia** (pain in the urinary bladder), **cystectomy** (excision of the urinary bladder), and **cystopexy** (surgical attachment of the urinary bladder to the abdominal wall or to other supporting structures).
- A test of kidney function is the **glomerular filtration rate (GFR)**.
- **Intravenous pyelogram (IVP)**: An X-ray or computed tomography (CT) scan of the kidneys, ureters, and bladder (KUB) after intravenous injection of a contrast dye.
- **Blood urea nitrogen (BUN)** is a blood test that measures kidney function by assessing the level of nitrogenous waste and urea that are in the blood.

# PRACTICE AND PRACTITIONERS

A **physician** who specializes in the diagnosis and treatment of urinary disorders is called a **urologist**, and the **specialty** practice is **urology**.

A **physician** who treats kidney and kidney disorders is called a **nephrologist**. This area of **specialty** is named **nephrology**.





**THANK YOU FOR  
YOUR ATTENTION**

