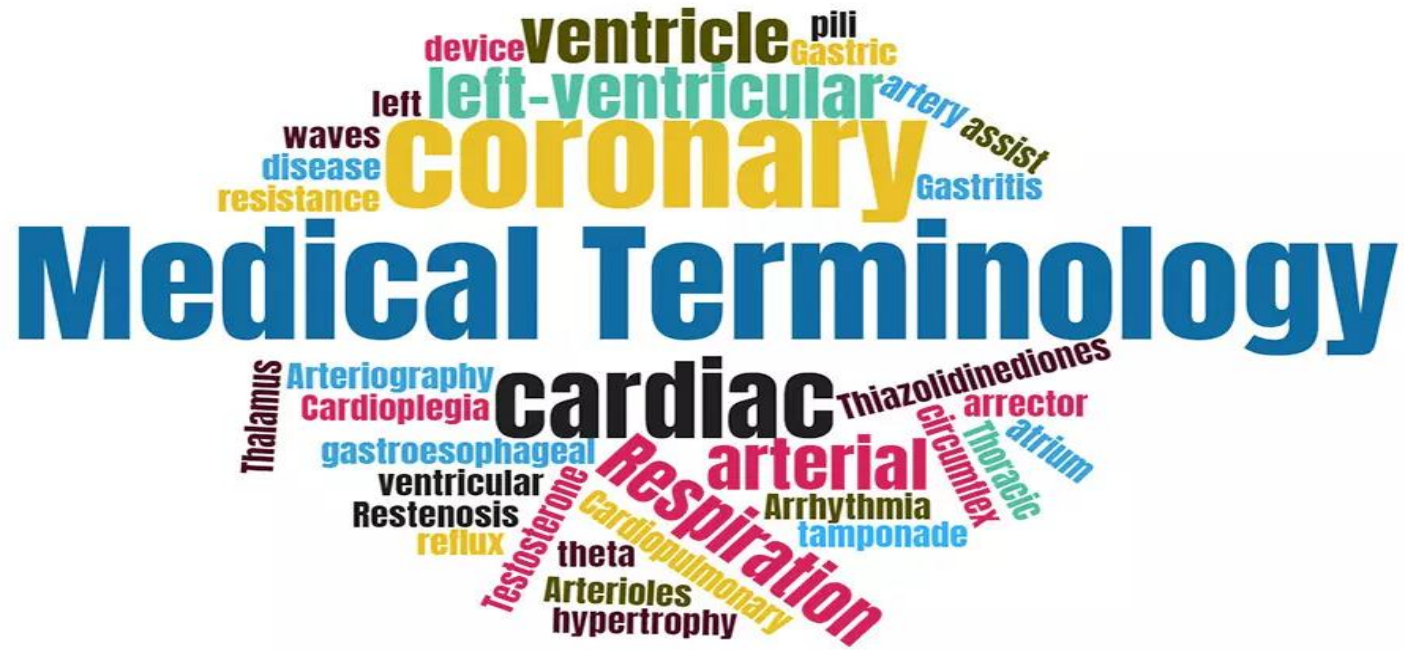




AL MUSTAQBAL UNIVERSITY

College of Pharmacy / First Stage



(L6) Urinary System Terminology

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Urinary System

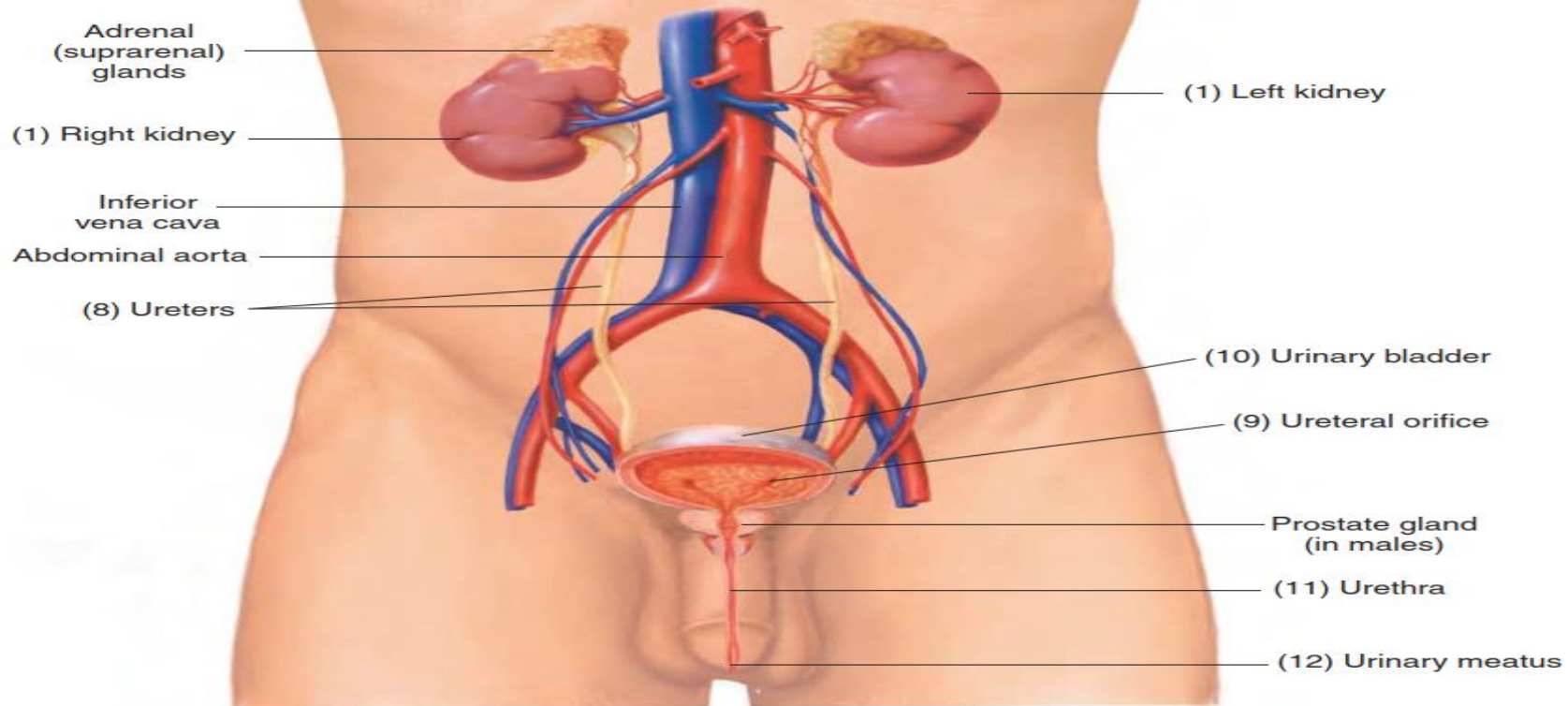
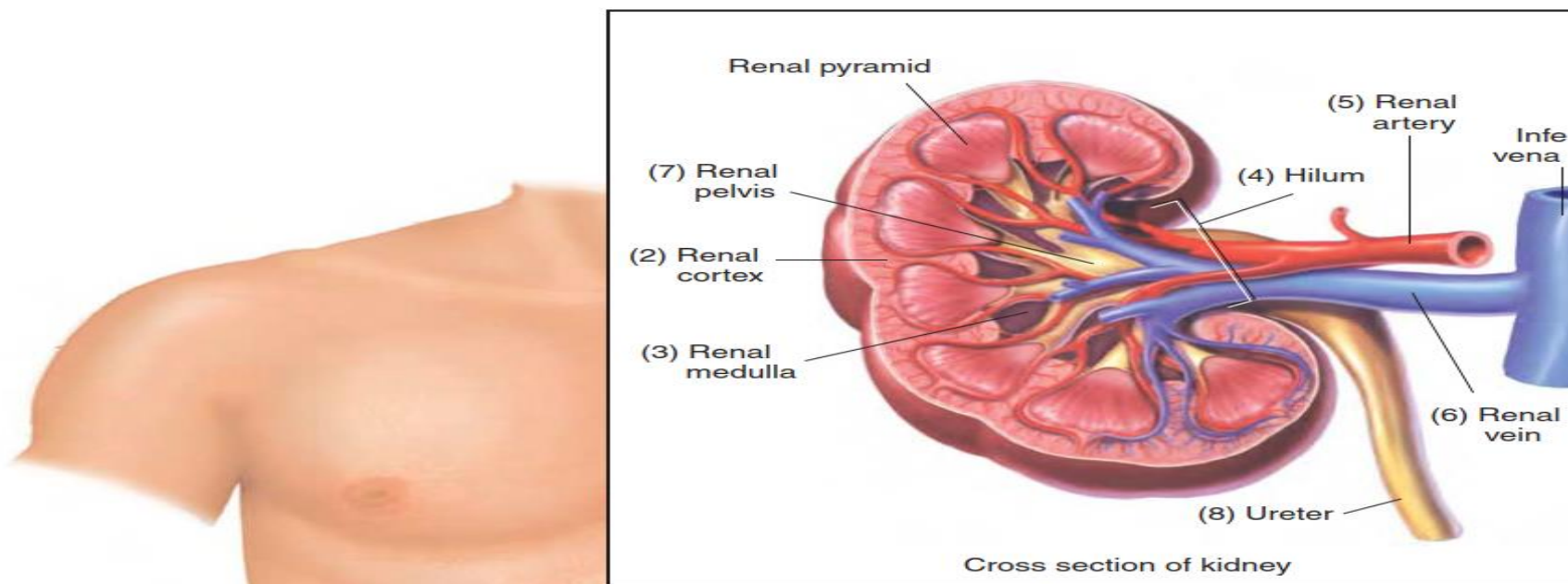
The purpose of the urinary system is to regulate extracellular fluids (plasma, tissue fluid, and lymph) of the body by removing a variety of harmful substances from plasma while retaining useful products.

Harmful substances, including nitrogenous wastes and excess electrolytes (sodium, potassium, and calcium), are excreted from the body as urine, while useful products are returned to the blood. **Nitrogenous wastes** are toxic to the body, and must be continuously eliminated or death will occur.

Electrolyte concentration must remain fairly constant for proper functioning of nerves, heart, and muscles. The kidneys also secrete **erythropoietin**, a hormone that acts on bone marrow to stimulate production of red blood cells when blood oxygen levels are low.

Four major types of structures make up the urinary system:

- **two kidneys**
- **two ureters**
- **bladder**
- **urethra**



The (1) kidneys, each about the size of a fist, are located in the abdominal cavity slightly above the waistline. Because they lie outside of the peritoneum, their location is said to be retroperitoneal. A concave medial border gives the kidney its beanlike shape.

In a frontal section, two distinct areas are visible, an outer section, the (2) renal cortex, and a middle area, the (3) renal medulla, which contain portions of the microscopic filtering units of the kidney called nephrons.

Near the medial border is the (4) hilum (hilus), an opening through which the (5) renal artery enters and the (6) renal vein exits the kidney. The renal artery carries blood that contains waste products to the nephrons for filtering. After waste products are removed, blood leaves the kidney by way of the renal vein.

Waste material, now in the form of urine, passes to a hollow chamber, the (7) renal pelvis. This cavity is an enlarged, funnel-shaped extension of the (8) ureter where the ureter merges with the kidney. Each ureter is a slender tube about 10 to 12 inches long that carries urine in peristaltic waves to the bladder. They pass behind the bladder and enter its base near the (9) ureteral orifice.

The (10) urinary bladder, an expandable hollow organ, acts as a temporary reservoir for urine. When empty, the bladder has small folds called rugae that allow expansion as the bladder fills. A triangular area at the base of the bladder called the trigone is delineated by the openings of the ureters and the urethra.

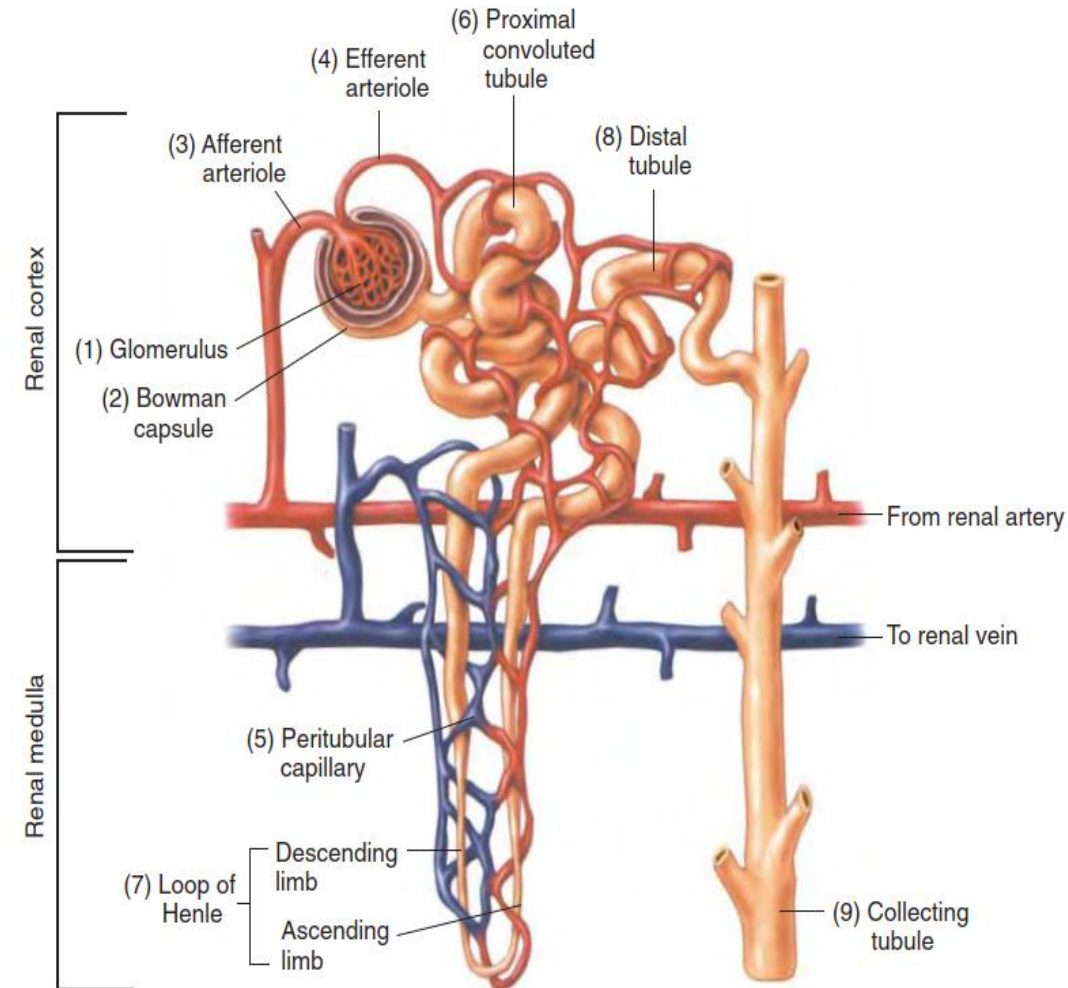
The base of the trigone forms the (11) urethra, the tube that discharges urine from the bladder. The length of the urethra is approximately 1.5 inches in women and about 7 to 8 inches in men. During micturition, urine is expelled through the urethral opening, the (12) urinary meatus.

Nephron

Microscopic examination of kidney tissue reveals the presence of approximately 1 million nephrons. These microscopic structures are responsible for maintaining homeostasis by continually regulating the amount of water, salts, glucose, urea, and other minerals in blood.

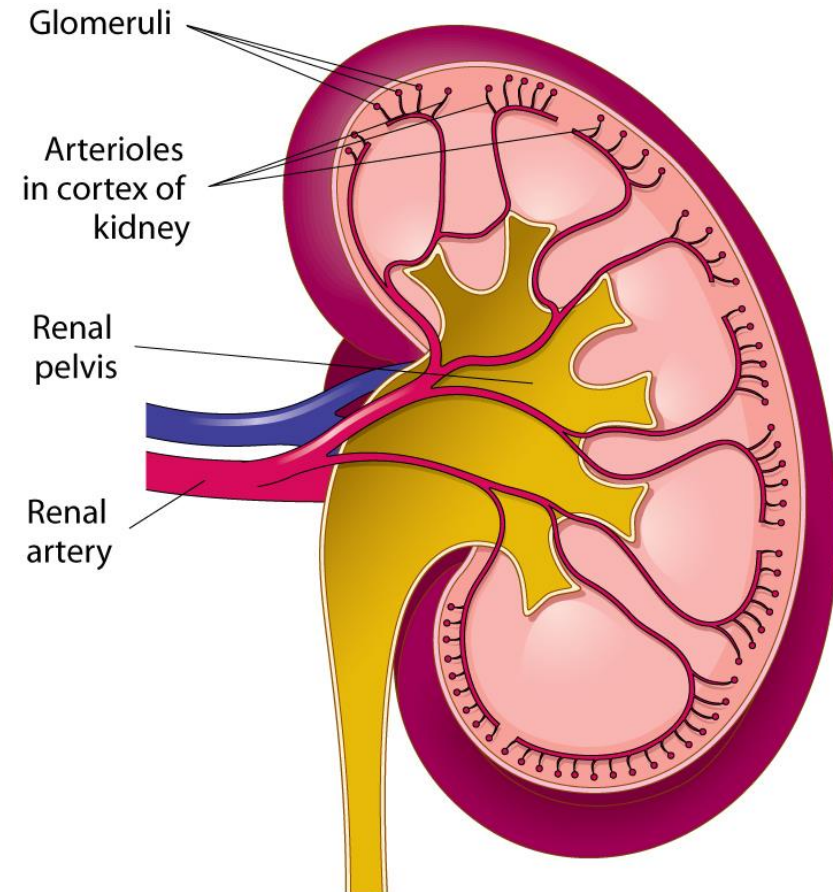
Substances removed by nephrons are nitrogenous wastes, including urea, uric acid, and creatinine, the end products of protein metabolism.

Nephrons also remove excess electrolytes and many other products that exceed the amount tolerated by the body.



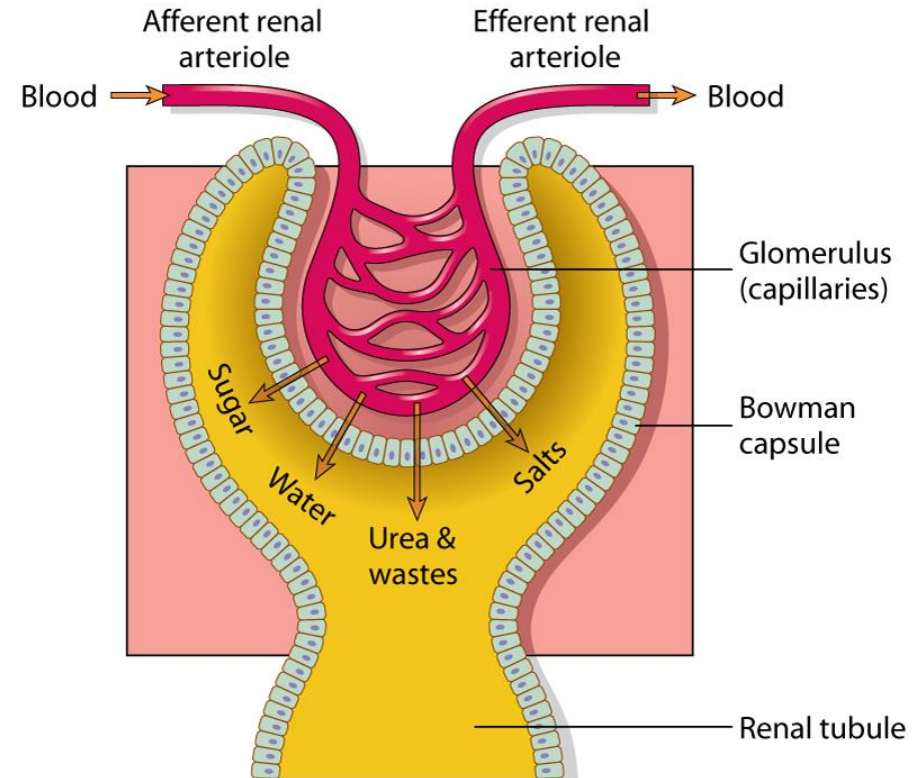
How Kidneys Produce Urine

- Blood enters the kidneys through the right and left **renal arteries**
- **Arterioles** carry blood to the **capillaries**
- **Glomeruli** filter the blood



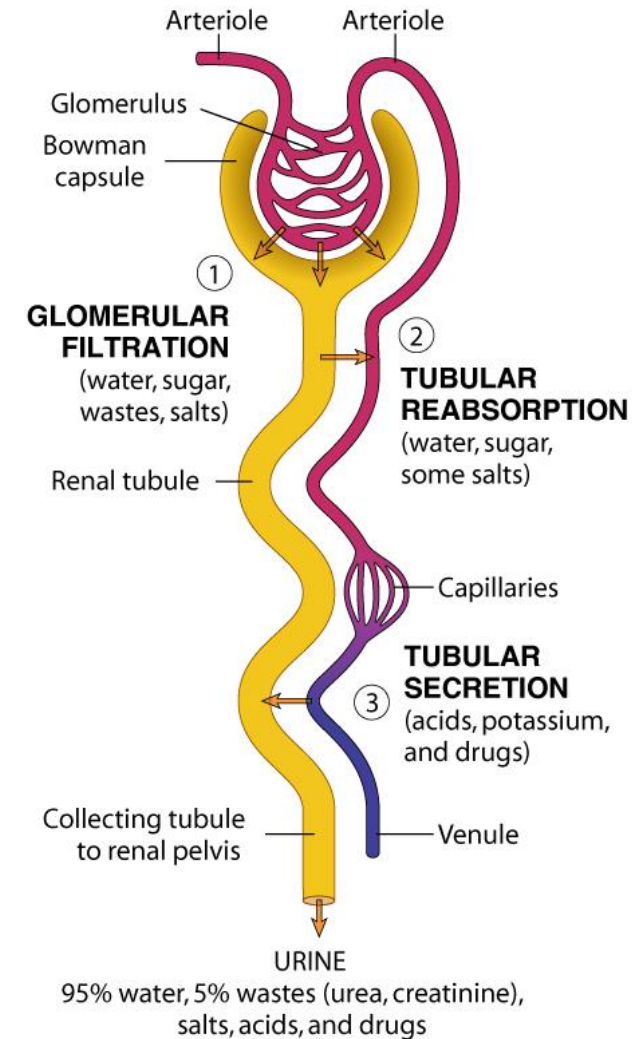
Glomerulus and glomerular/Bowman capsule

- Blood passes through the glomeruli
- Glomerular (Bowman) capsule surrounds each glomerulus
- **Renal tubule** is attached to each Bowman capsule



Three steps in the formation of urine

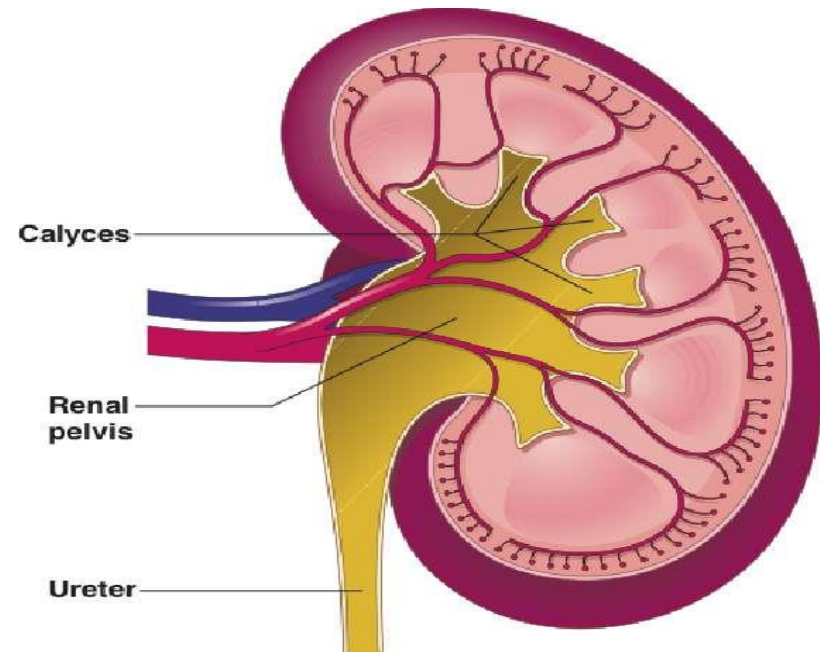
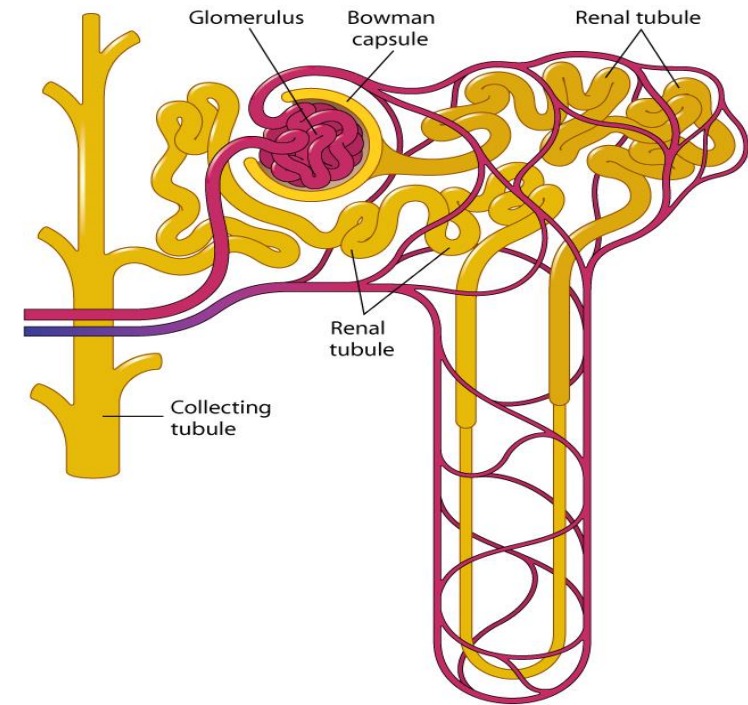
- Glomerular filtration
- Tubular reabsorption
- Tubular secretion



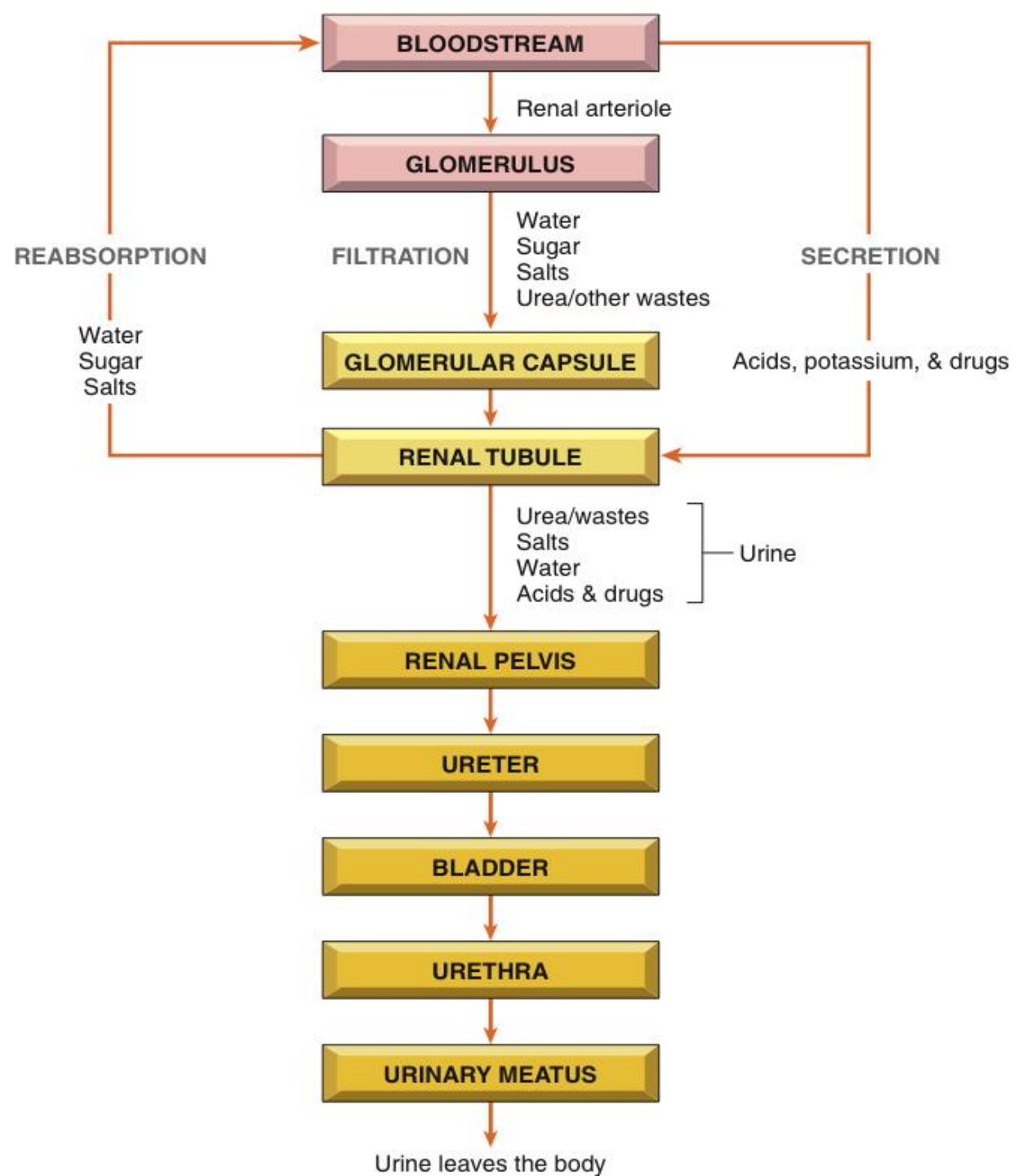
- The glomerulus and a renal tubule combine to form a unit called a **nephron**.

All collecting tubules lead to the **renal pelvis**

Calyces or **calices** are small, cuplike regions of the renal pelvis; the term comes from the Greek, *kalux*, meaning a cup or case surrounding a flower bud



Process of forming and expelling urine



ROOT ren/o		MEANING kidney
<i>Term</i>	<i>Term Analysis</i>	<i>Definition</i>
renal hypoplasia (REE-nal high-poh-PLAY-zee-ah)	-al = pertaining to -plasia = formation; development hypo- = under; below normal; deficient	underdeveloped kidney

ROOT ureter/o		MEANING ureter
<i>Term</i>	<i>Term Analysis</i>	<i>Definition</i>
ureteral (yoo-REE-ter-al)	-al = pertaining to	pertaining to the ureter
ureterectasis (yoo-ree-ter-ECK-tah-sis)	-ectasis = dilation; stretching; widening	dilation of ureter
ureterorrhagia (yoo-ree-ter-oh-RAY-jee-ah)	-rrhagia = hemorrhage; burst- ing forth	bleeding from the ureter

ROOT vesic/o		MEANING bladder
<i>Term</i>	<i>Term Analysis</i>	<i>Definition</i>
vesical (VES-ih-kal)	-al = pertaining to	pertaining to the bladder

ROOT urethr/o		MEANING urethra
<i>Term</i>	<i>Term Analysis</i>	<i>Definition</i>
transurethral (tranz-yoo-REE-thral)	-al = pertaining to trans- = through; across	pertaining to something moving through the urethra
urethrostenosis (yoo-ree-troh-steh-NOH-sis)	-stenosis = narrowing	narrowing of the urethra

ROOT cyst/o (see also vesic/o)		MEANING bladder; cyst (closed sac or cavity filled with fluid)
<i>Term</i>	<i>Term Analysis</i>	<i>Definition</i>
cystitis (sis-TYE-tis)	-itis = inflammation	inflammation of the bladder
cystoscopy (sis-TOS-koh-pee)	-scopy = process of visually examining	process of visually examining the bladder (Figure 16-3).

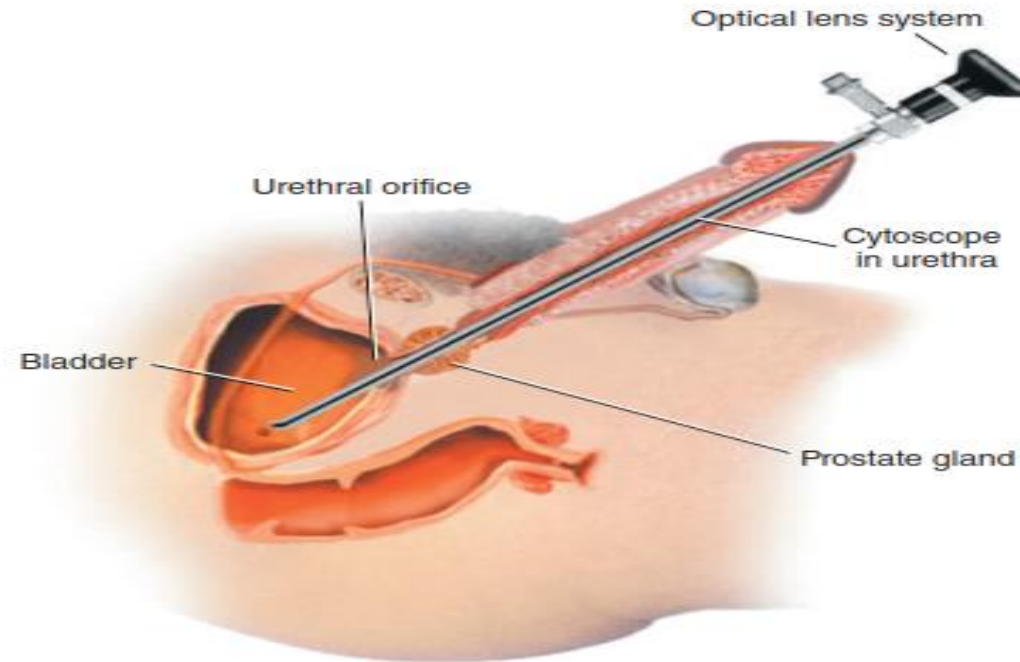


Figure 16-3 Cystoscopy.

ROOT glomerul/o		MEANING glomerulus (portion of the nephron that filters blood)
<i>Term</i>	<i>Term Analysis</i>	<i>Definition</i>
glomerulonephritis (gloh-mer-yoo-loh-neh-FRY-tis)	-itis = inflammation nephro/o = kidney	inflammation of the glomerulus and kidney; Bright disease

SUFFIX
-uria

MEANING
urine; urination

<i>Term</i>	<i>Term Analysis</i>	<i>Definition</i>
anuria (ah- N00 -ree-ah)	an- = no; not; lack of	no urine formation; also known as suppression (suh- PRESH -un)
dysuria (dis- Y00 -ree-ah)	dys- = painful; bad; difficult	painful urination
hematuria (hem-ah- T00 -ree-ah)	hemat/o = blood	blood in the urine
nocturia (nock- T00 -ree-ah)	noct/o = night	frequent urination at night
oliguria (ol-ih- G00 -ree-ah)	oligo- = scanty; deficient; few	decreased urination
polyuria (pol-ee- Y00 -ree-ah)	poly- = many	excretion of large amounts of urine
pyuria (pye- Y00 -ree-ah)	py/o = pus	pus in the urine

ROOT
ur/o

MEANING
urinary tract; urine; urination

<i>Term</i>	<i>Term Analysis</i>	<i>Definition</i>
uremia (yoo- REE -mee-ah)	-emia = blood condition	accumulation of waste products in the blood; also known as azotemia (az-oh- TEE -mee-ah). A toxic state when kidney failure causes the buildup of wastes in the blood.
urologist (yoo- ROL -ah-jist)	-logist = specialist	specialist in the study of the urinary system in females and the urinary and reproductive systems in males
urogram (YOO -roh-gram)	-gram = record	x-ray of the urinary tract (Figure 16-7)



SUFFIX -lysis		MEANING separation; breakdown; destruction
<i>Term</i>	<i>Term Analysis</i>	<i>Definition</i>
dialysis (dye- AL -ih-sis)	dia- = through; complete	mechanical replacement of kidney function when the kidney is not working (Figure 16-9); hemodialysis (hee -moh-dye- AL -ih-sis)



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Figure 16-9 Hemodialysis. Mechanical replacement of kidney function when the kidney is not working. Once the patient's blood has been filtered, it is returned to the patient's body.

urinalysis (yoo-rih- NAL -ih-sis)	urin/o = urine ana- = apart	laboratory analysis of urine
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SUFFIX -tripsy	MEANING crushing	
<i>Term</i>	<i>Term Analysis</i>	<i>Definition</i>
lithotripsy (LITH-oh-trip-see)	lith/o = stone; calculus	crushing of kidney stones tiny enough to be eliminated without surgical removal. Extracorporeal (ex-trah-kor-por-ee-al) shock wave lithotripsy uses ultrasound to crush the stones, which are then passed into the urine. Extracorporeal means outside the body (Figure 16-10).

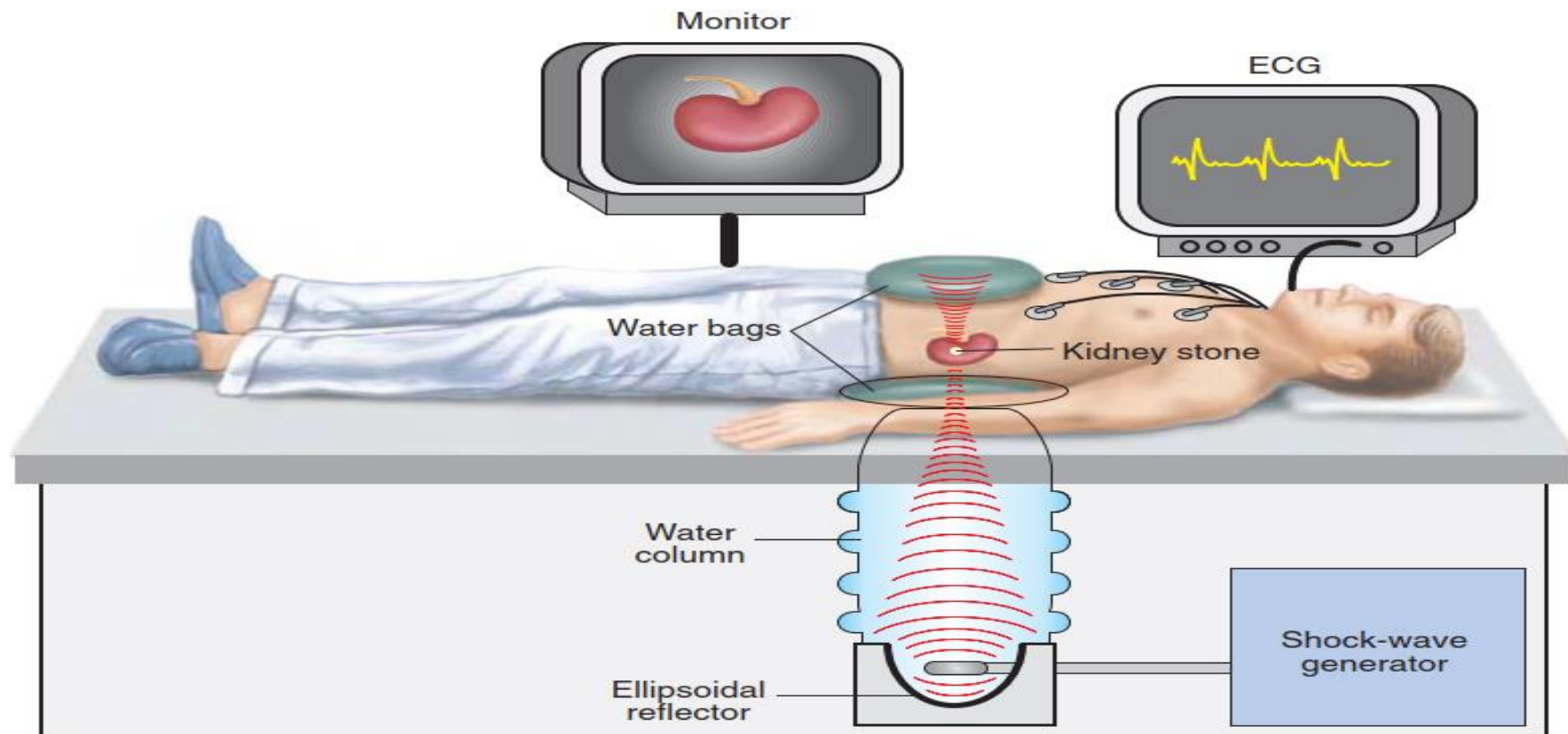
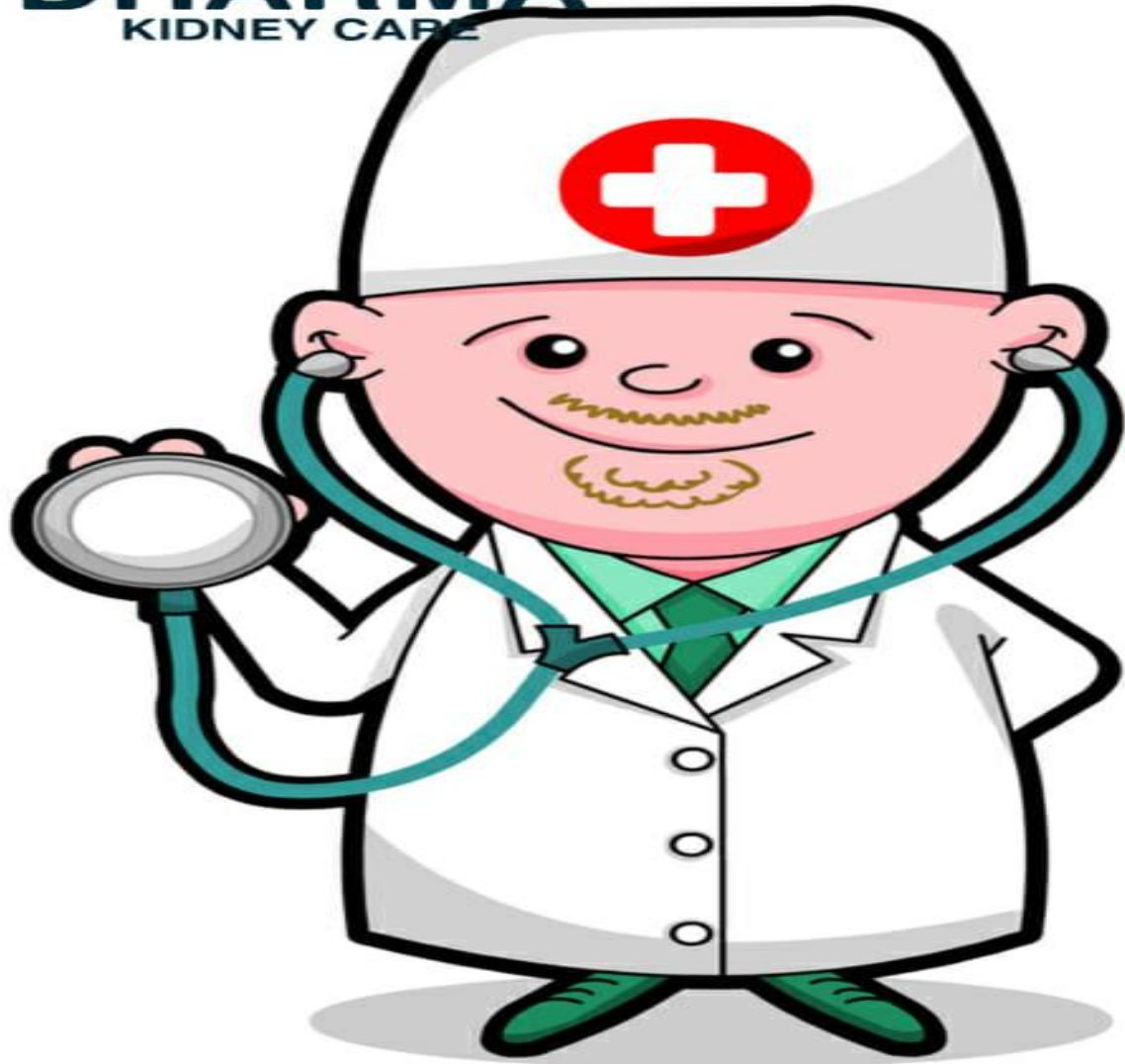
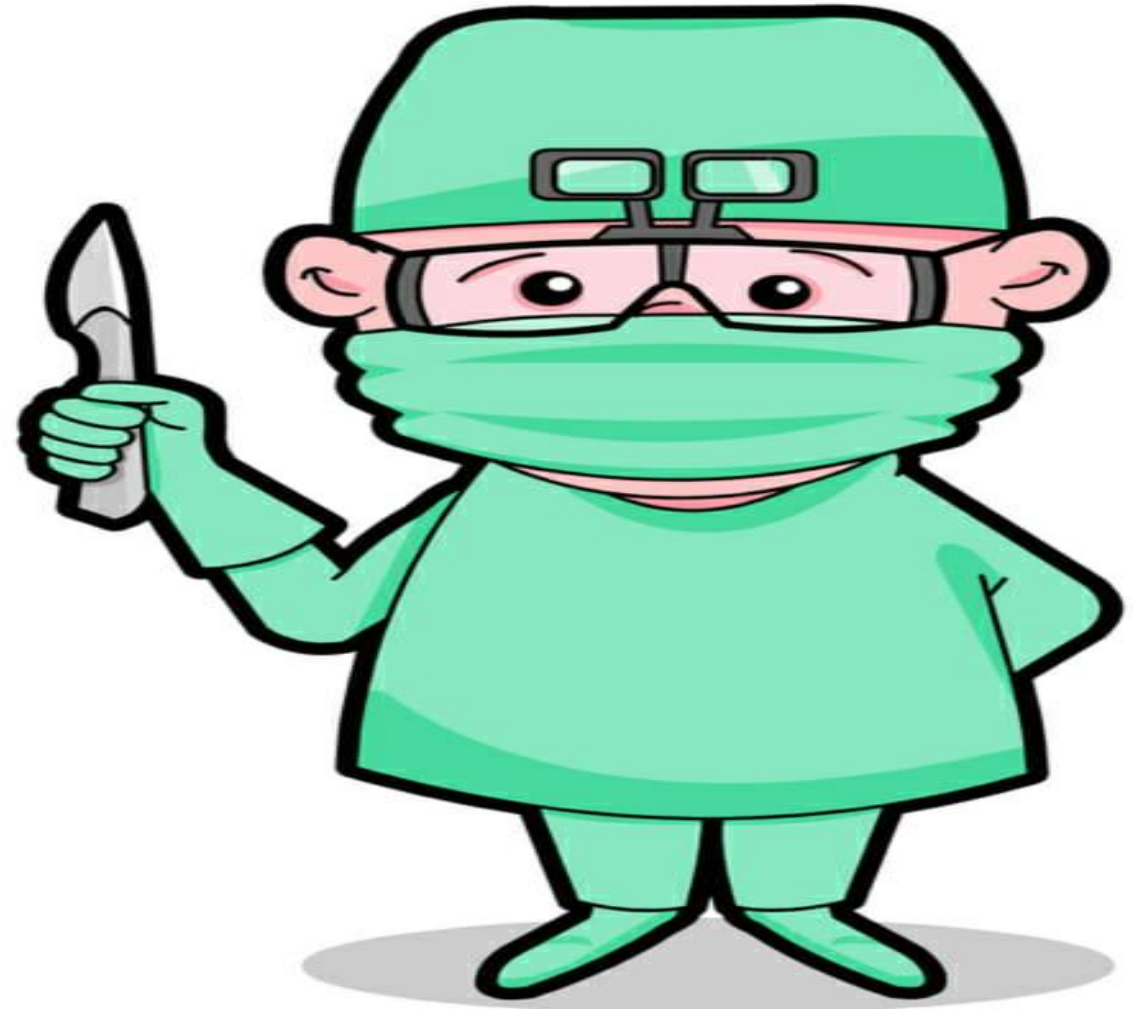


Figure 11-5 Extracorporeal shockwave lithotripsy.

DHARMA
KIDNEY CARE



Nephrologist



Urologist

OR

Urologist vs Nephrologist

A urologist is a surgical kidney specialist who treats mainly structural diseases of the kidney. In other words, the problem is due to physical reasons such as:

- 1. kidney stones**
- 2. cancer of the urinary tract**
- 3. blockages in the passage of urine leading to swelling of the kidney (“hydronephrosis”)**
- 4. prostate enlargement**
- 5. birth defects in the kidney (like cysts, deformed kidneys, etc)**

A nephrologist, on the other hand, is a medical kidney specialist who manages mainly functional issues of the kidney. So, the kidney function is impaired resulting in :

- 1. kidney failure needing dialysis or kidney transplantation**
- 2. protein leakage in the urine**
- 3. high blood pressure or hypertension (yes, kidneys maintain your blood pressure)**
- 4. decreased kidney function (called “chronic kidney disease”)**
- 5. imbalances in the chemical composition of blood (high or low sodium and/or potassium in the blood)**

TERM	DEFINITION
Nephrology	Nephr(o) means kidney
	-logy means the study of.
	Nephrology is the study of the anatomy and physiology of the kidney.
Nephrologists	Nephr(o) means kidney
	-logist means one who studies.
	A nephrologists is physician specializing in the conditions such as kidney disease, renal failure, dialysis patients and renal transplants.
Urology	Ur(o) means urine
	-logy means the study of.
	Urology is the study of the anatomy and physiology of the urinary tract and the male and female reproductive system.
Urologist	Ur(o) means urine
	-logist means one who studies.

TERM	DEFINITION
<p align="center">Intravenous pyelogram (IVP)</p>	<p>Intravenous is pertaining to inside the vein. Pyel(o) means kidney or pelvis. -gram means a drawing or a written record. An x-ray of the kidneys and other structures of the urinary tract using a intravenously injected contrast material.</p>
<p align="center">Magnetic Resonance Imaging (MRI)</p>	<p>Magnetic means lodestone. Resonance means to sound again. Imaging means image. An MRI is a procedure used to produce an image by the creation of a magnetic field to give detailed information about the kidneys.</p>
<p align="center">Renal arteriogram</p>	<p>Renal is pertaining to the kidneys. Arteriogram is an x-ray of an artery that has been injected with a radiopaque contrast material. A renal arteriogram is the visualization of the renal blood vessels.</p>
<p align="center">Urinary tract infection (UTI)</p>	<p>Urinary means urine or the formation of urine. Urinary tract is the organs involved in the secretion and elimination of urine. A UTI is an infection of any of the structures of the urinary tract.</p>

TERM	DEFINITION
Pyelogram	<p>Pyel(o) means kidney or pelvis.</p>
	<p>-gram means a drawing or a written record. A pyelogram is an x-ray of the upper urinary tract after the introduction of a radiopaque contrast material.</p>
Computed tomography (CT)	<p>A CT is a technique that uses radiographic to produce an image of the cross section of tissue. It is used to visualize the kidneys.</p>
Cystogram	<p>Cyst(o) bladder or sac.</p>
	<p>-gram means a drawing or a written record. The visualization and recording of the urinary bladder after a radiopaque contrast material has been introduced.</p>
Renal arteriogram	<p>Renal is pertaining to the kidneys.</p>
	<p>Arteriogram is an x-ray of an artery that has been injected with a radiopaque contrast material.</p>
	<p>A renal arteriogram is the visualization of the renal blood vessels.</p>



THANK YOU!

