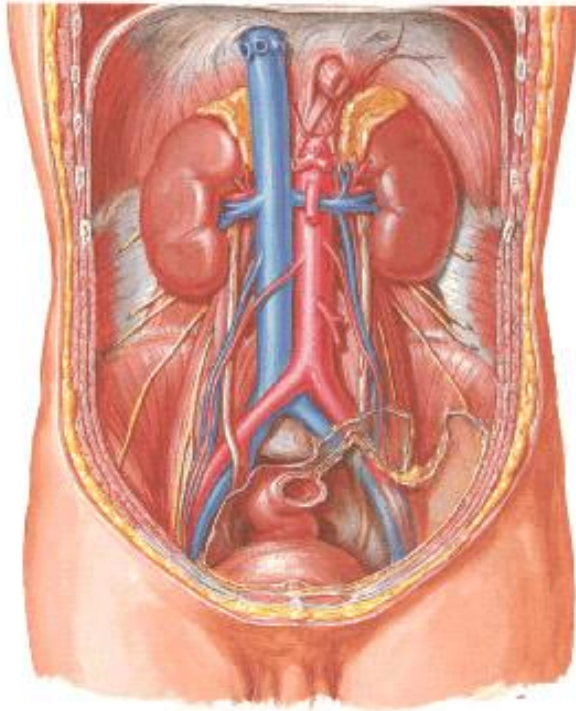


Biomedical Terminology

Urinary System

Urinary System

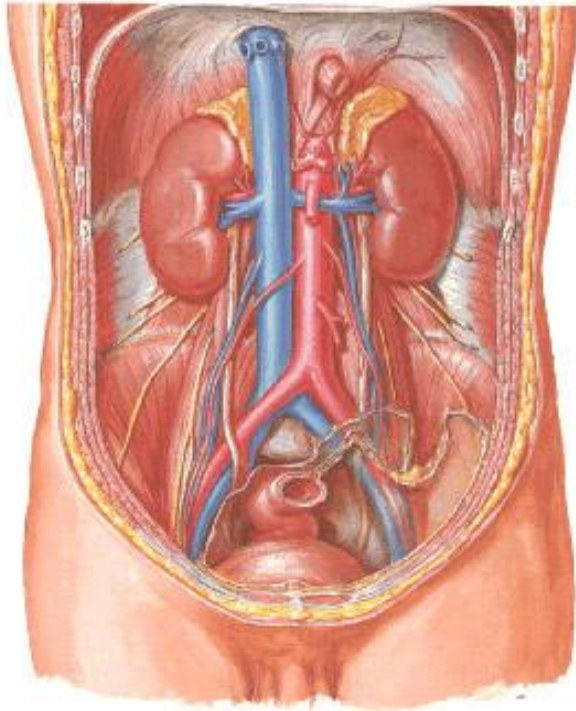
Kidneys in Situ
Anterior View



- The urinary system removes waste from the blood, regulates fluid volume, and maintains electrolyte concentration in the fluids of the body

Urinary System

Kidneys in Situ
Anterior View

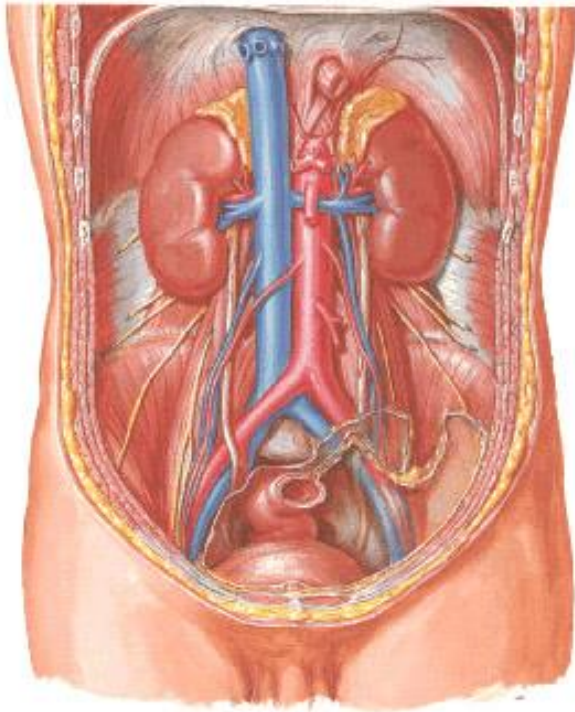


- Major structures include
 - Kidneys (nephro/o, ren/o)
 - Ureters (ureter/o)
 - Urinary bladder (cyst/o, vesic/o)
 - Urethra (urethr/o)

Urinary System

Kidneys in Situ

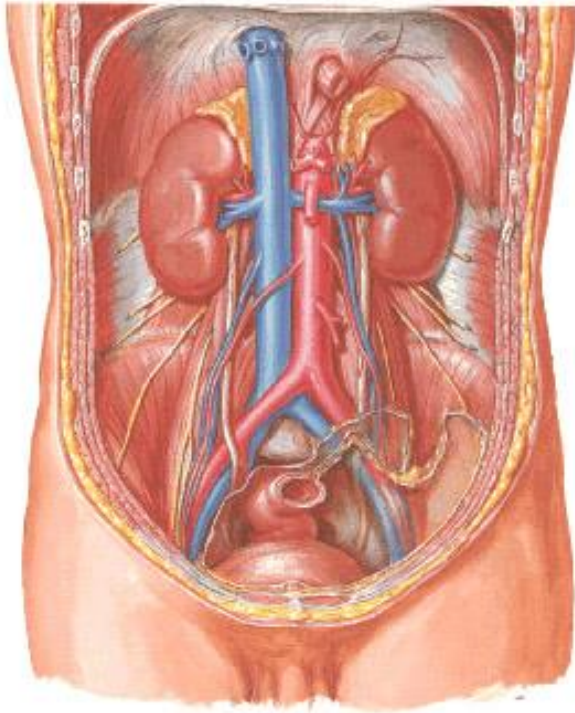
Anterior View



- Kidneys (nephro/o, ren/o)
 - Two organs on either side of the vertebral column. Their function is to remove waste from the blood, and to regulate water and electrolyte balance
- Ureters (ureter/o)
 - Slender tubes which receive urine from the kidneys and transport it to the urinary bladder

Urinary System

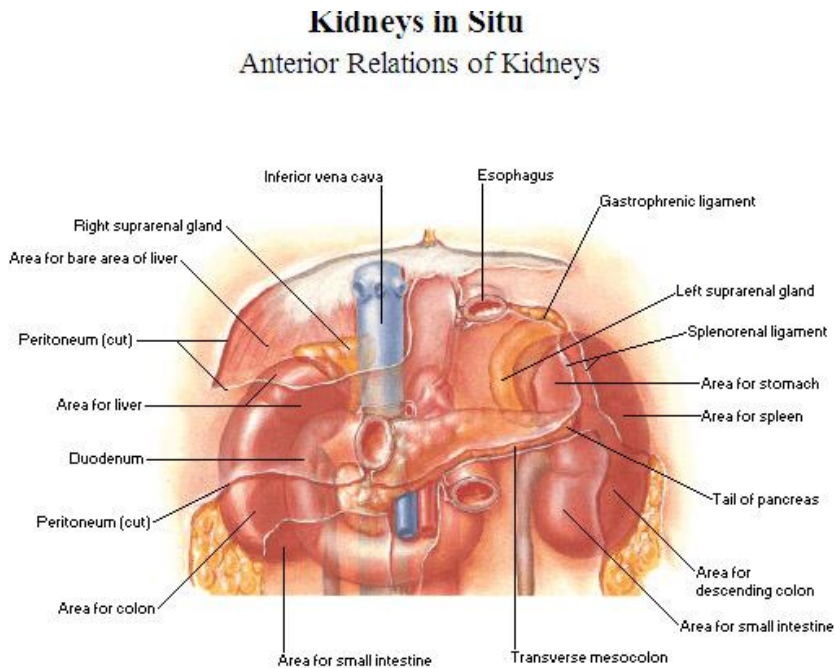
Kidneys in Situ
Anterior View



- Urinary bladder (cyst/o, vesic/o)
 - Muscular, hollow organ that temporarily holds the urine
- Urethra (urethr/o)
 - Transports urine from the bladder to the outside

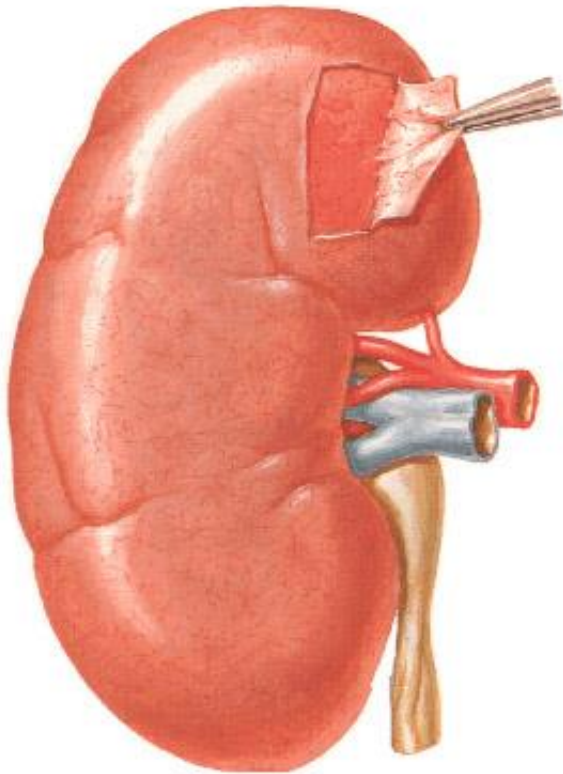
Kidneys

- The kidneys are retroperitoneal (behind the peritoneum)
- The right kidney is usually lower than the left due to the size of the liver



Fluid Balance

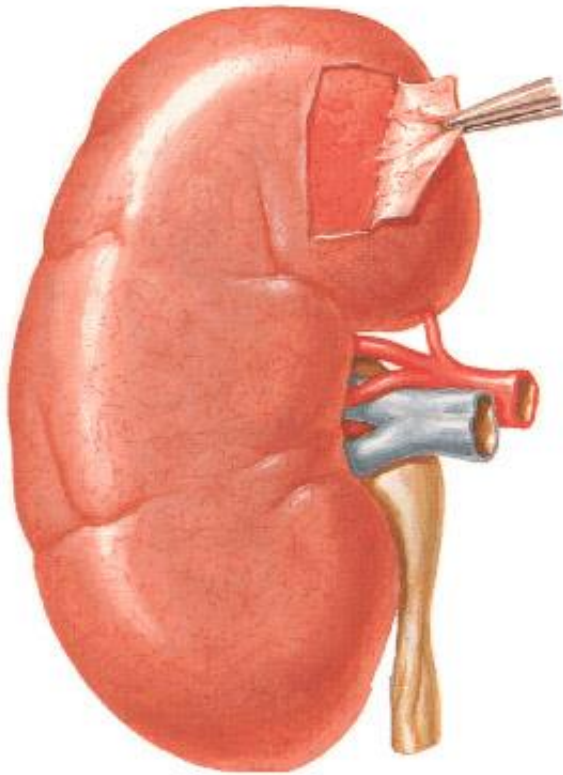
Anterior Surface of Right Kidney



- **Vascular supply**
 - The kidney is supplied with blood by the renal artery
 - This is a direct branch from the abdominal aorta

Fluid Balance

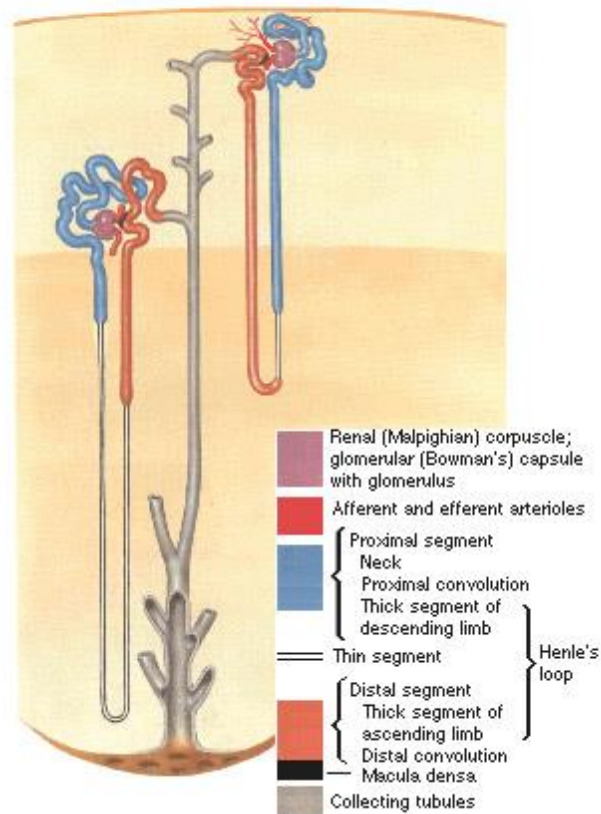
Anterior Surface of Right Kidney



- If someone is volume depleted (due to dehydration or blood loss), the kidneys can initiate the renin-angiotensin mechanism
- This system regulates blood volume and blood pressure
- It causes
 - Thirst
 - Vasoconstriction
 - The adrenal glands to release aldosterone
 - Aldosterone causes more Na (and Water) to be absorbed from the kidneys

Fluid Balance

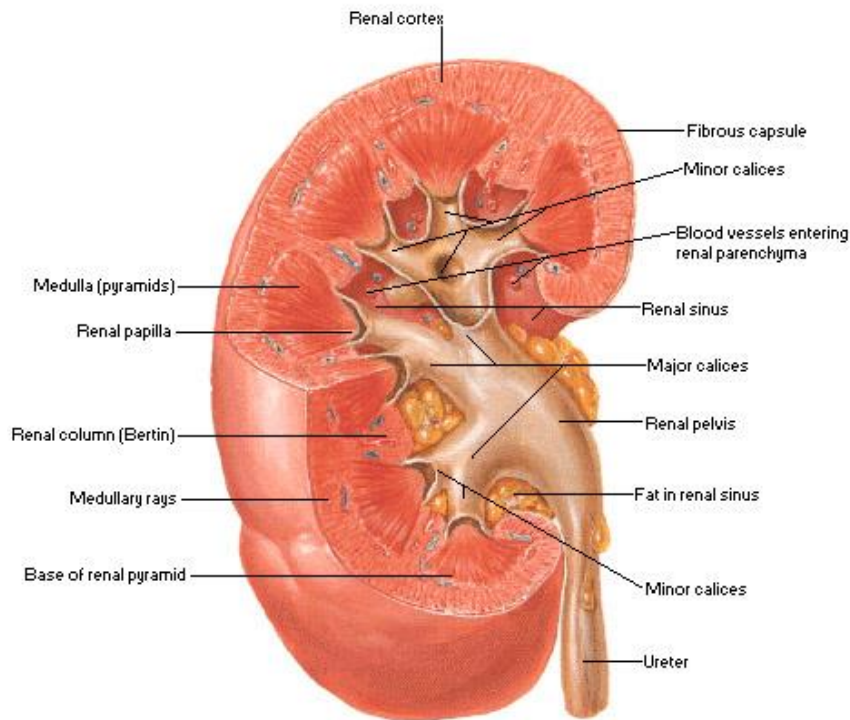
Nephron and Collecting Tubule
Schema



- Histology of kidneys
 - Nephron
 - The microscopic functional unit of the kidneys which filter wastes and produce urine
 - Glomerulus (glomerul/o)
 - Cluster of arterioles at the entrance of the nephron
 - Contains afferent blood arterioles and efferent arterioles

Renal Pelvis

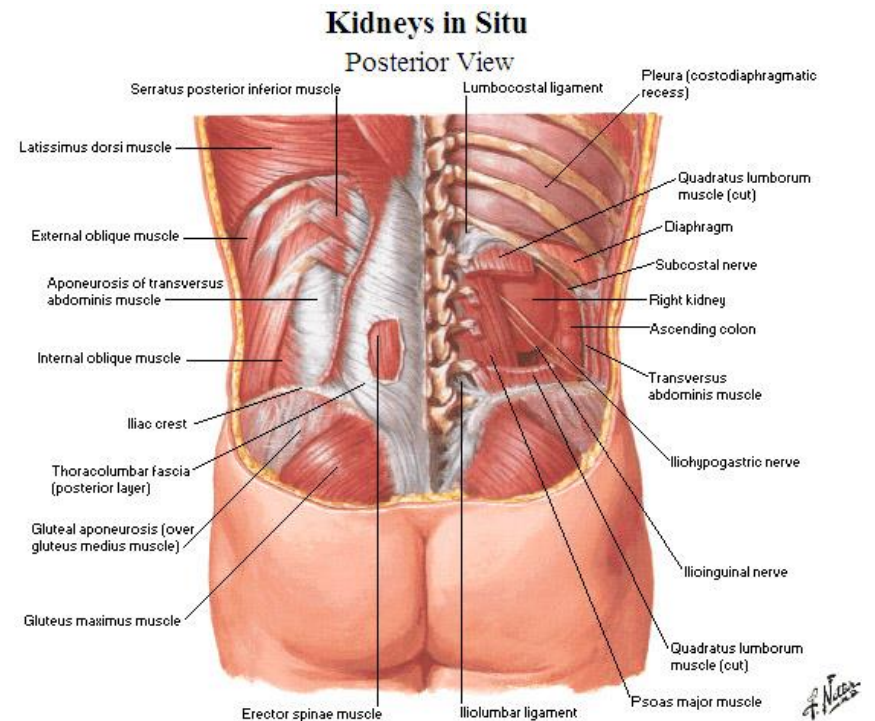
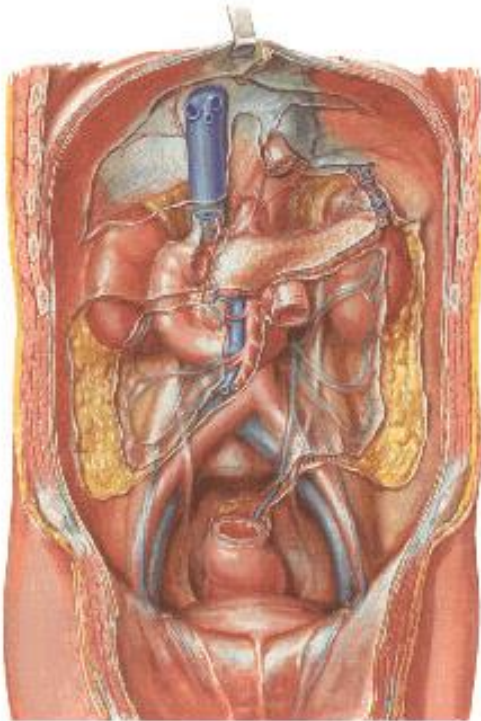
Right Kidney Sectioned in Several Planes



- Renal Pelvis (pyel/o)
 - Funnel shaped reservoir that collects the urine from the calices (which are connected to the collecting ducts) and passes it to the ureters
 - Hilum
 - Indentation on the medial side of the kidney where the ureters leave and blood vessels enter and exit the kidneys

Relation of Kidneys to Peritoneum

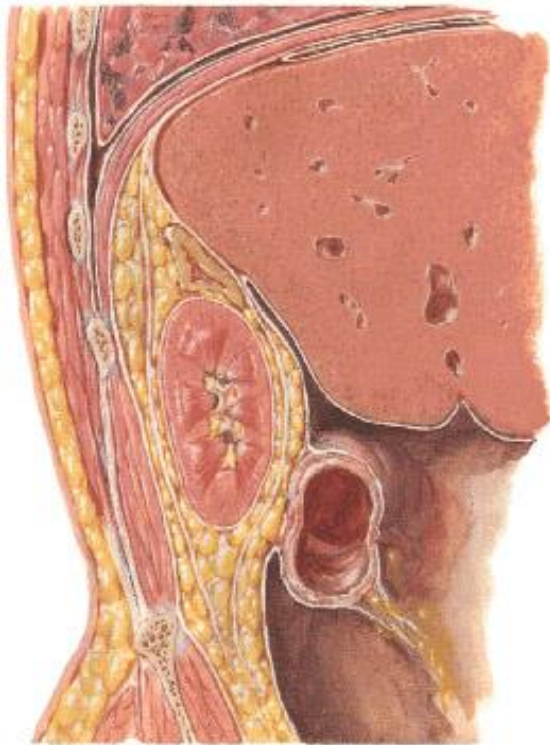
Peritoneum of Posterior Abdominal Wall



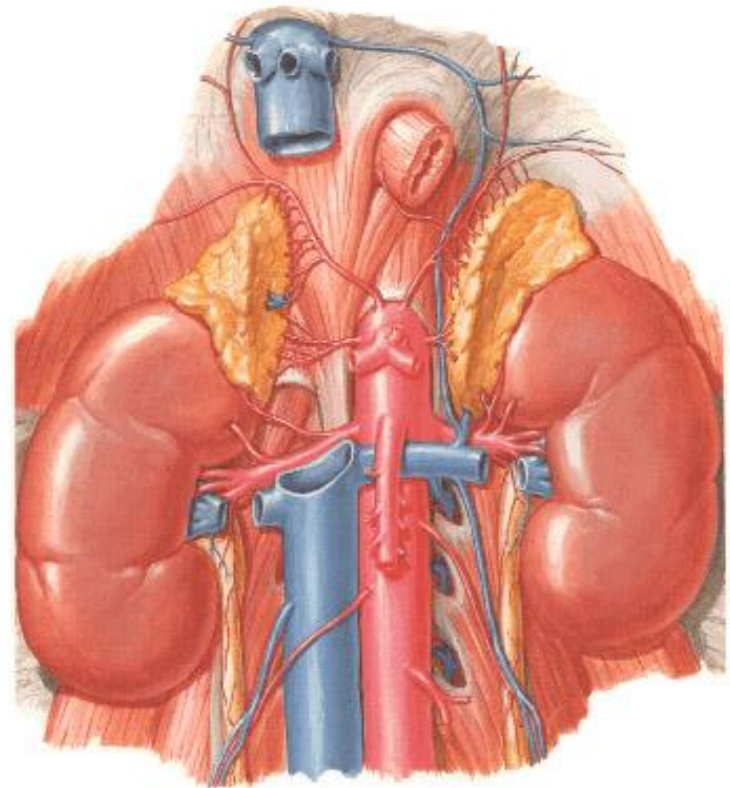
Kidneys

Renal Fascia

Sagittal Section through Right Kidney



Renal Artery and Vein in Situ



Urinary System

Information Relevant to the Test

Combining Forms of the Urinary System

- **Cyst/o, vesic/o**
 - Bladder, sac
 - Ex) Cystocele
 - -cele – protrusion
 - Protrusion of the bladder
- **Meat/o**
 - Meatus (opening)
 - Ex) Meatotomy
 - -tomy – incision
 - Incision of the meatus
- **Glomerul/o**
 - Glomerulus
 - Ex)
Glomerulonephritis
 - Inflammation of the glomeruli of the kidney

Combining Forms of the Urinary System

- Nephro/o, ren/o
 - Kidney
 - Ex) Nephritis
 - -itis – inflammation
 - Inflammation of a kidney
- Pyelo/o
 - Renal pelvis
 - Ex) Pyelolithotomy
 - -tomy – cut into or incision
 - Incision of the renal pelvis to remove a stone
- Ureter/o
 - Ureter
 - Ex) Ureterolithiasis
 - -lith – stone
 - -iasis – condition
 - Condition of stones in the ureter
- Urethra/o
 - Urethra
 - Ex) Urethroscopy
 - Visual examination of the urethra

Combining Forms Commonly Used with Urinary System Terms

- Albumin/o
 - Albumin
 - Ex) Albuminuria
 - -uria – urine, urination
 - Albumin in the urine
 - Normally, albumin is not filtered at the kidneys, if there is albumin in the urine, this indicates kidney problems
- Azot/o
 - Urea, nitrogen
 - Ex) Azotemia
 - -emia – blood condition
 - (Excessive) urea and nitrogenous substances in the blood

Combining Forms Commonly Used with Urinary System Terms

- Blast/o
 - Developing cells, germ cells
 - Ex) Nephroblastoma
 - - blastoma – neoplasm composed of immature and undifferentiated cells
 - Malignant kidney tumor developing from germ cells
 - This is also called a Wilms tumor
- Glyc/o, glycos/o
 - Sugar
 - Ex) Glycosuria
 - Sugar (glucose) in the urine

Combining Forms Commonly Used with Urinary System Terms

- Hydr/o
 - Water
 - Ex) Hydronephrosis
 - -osis – abnormal condition
 - Abnormal condition of water in the kidney (distention of the renal pelvis with urine because of an obstruction)

Combining Forms Commonly Used with Urinary System Terms

- Lith/o
 - Stone, calculus
 - Ex) Nephrolithiasis
 - -lith – stone
 - -iasis – condition
 - Condition of stone(s) in the kidney
 - Also referred to as a renal calculi
 - Ex) Pyelolithotomy
 - Pyel/o – renal pelvis
 - -tomy – incision
 - Incision of the renal pelvis to remove a stone

Combining Forms Commonly Used with Urinary System Terms

- Noct/i
 - Night
 - Ex) nocturia
 - Night urination
- Olig/o
 - Scanty, few
 - Ex) Oligouria
 - Scanty urine (amount)
- Son/o
 - Sound
- Tom/o
 - Cut, section
- Urin/o, ur/o
 - Urine, urinary tract

Suffixes

- -iasis, -esis
 - Condition
 - Ex) Nephrolithiasis
 - Condition of stone(s) in the kidney
- -lysis
 - Loosening, dissolution, separating
 - Ex) Nephrolysis
 - Separating the kidney (from other body structures)
- -megaly
 - Enlargement
 - Ex) nephromegaly
 - Enlargement of a kidney
- -ptosis
 - Drooping, sagging, prolapse
 - Ex) Nephroptosis
 - Prolapsed kidney

Suffixes

- -rrhaphy
 - Suturing, repairing
 - Ex) cystorrhaphy
 - Suturing the bladder
- -tripsy
 - Surgical crushing
 - Ex) lithotripsy
 - Surgical crushing of a stone
- -trophy
 - Nourishment, development
 - Ex) Nephrohypertrophy
 - Excessive development (increase in size) of the kidney
- -uria
 - Urine, urination
 - Ex) polyuria
 - Much (excessive) urination

Terminology

Nephr/o, Ren/o – Kidney

- Nephritis
 - -itis – inflammation
 - Inflammation of a kidney
- Nephroblastoma
 - -blastoma – neoplasm composed of immature and undifferentiated cells
 - Malignant kidney tumor developing from germ cells
 - This is also called a Wilms tumor)
- Nephrohypertrophy
 - Hypertrophy – excessive development
 - Excessive development (increase in size) of the kidney
- Nephrolithiasis
 - -lith – stone
 - -iasis – condition
 - Condition of stone(s) in the kidney
 - Also referred to as a renal calculi

Terminology

Nephr/o, Ren/o – Kidney

- Nephroma
 - -oma – tumor
 - Tumor of the kidney
- Nephromegaly
 - -megaly – enlargement
 - Enlargement of a kidney
- Nephroptosis
 - -ptosis – drooping or prolapse
 - Prolapsed kidney
- Nephrectomy
 - -ectomy – incision
 - Incision of a kidney
- Nephrostomy
 - -stomy creation of an artificial opening
 - Creation of an artificial opening into the kidney

Terminology

Pyel/o – Renal Pelvis

- Pyel/o – renal pelvis
 - Pyelitis
 - Inflammation of the renal pelvis
 - Pyelonephritis
 - Inflammation of the renal pelvis and kidney
 - Pyelolithotomy
 - -tomy – cut into or incision
 - Incision of the renal pelvis to remove a stone

Terminology

Cyst/o - Bladder

- Cystitis
 - -itis – inflammation
 - Inflammation of the bladder
- Cystocele
 - -cele – protrusion
 - Protrusion of the bladder
- Cystolith
 - -lith – stone
 - Stone in the bladder
- Cystogram
 - -gram – record, x-ray image
 - X-ray image of the bladder
- Cystoscopy
 - -scopy – visual examination (with a scope)
 - Visual examination of the bladder

Terminology – Ureter/o

- Ureteritis
 - Inflammation of the ureters
- Ureterocele
 - Protrusion of a ureter
- Ureterolithiasis
 - -lith – stone
 - -iasis – condition
 - Condition of stones in the ureter
- Ureterostenosis
 - -stenosis – narrowing
 - Narrowing of the ureter
- Ureterostomy
 - -stomy creation of an artificial opening
 - Creation of an artificial opening into the ureter

Terminology – Urethr/o

- Urethrocystitis
 - Inflammation of the urethra and bladder
- Urethroplasty
 - -plasty – surgical repair
 - Surgical repair of the urethra
- Urethroscopy
 - Visual examination of the urethra

Other Terminology

- KUB (kidney, ureter, bladder)
 - A common x-ray image of the abdomen
 - Used to view size, shape and location
 - Also can visualize stones and location
- BUN (blood urea nitrogen)
 - A blood test that measures the amount of urea in the blood
 - Used to determine kidney (and liver) function
- Creatinine
 - A blood test that measures creatinine levels in the blood

Other Terminology

- Urine – ur/o, urin/o and suffix –uria
 - Uremia
 - -emia – blood
 - Condition of urea in the blood
 - Anuria, oligouria, polyuria
 - An-, a- – without, absence of
 - Oligo- – few
 - Poly- - many
 - Anuria – absence of urine
 - Oligouria – scanty urine (amount)
 - Poly – excessive urine (amount)
- Pyuria
 - Py- pus
 - Pus in the urine
- Dysuria
 - Dys- - difficult, painful
 - Difficult or painful urination