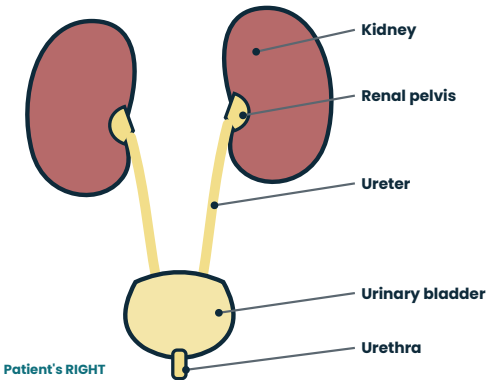
Urinary System

Study Sheet · Learn It with Prof. Melanie

1 The Urinary System

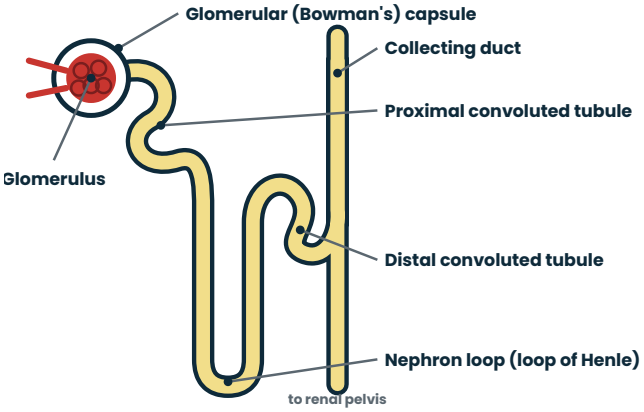


2 Organs

- **Kidneys:** retroperitoneal, T12–L3; right is slightly lower; cortex, medulla, renal pelvis, hilum
- **Ureters:** two; peristalsis to the bladder
- **Bladder:** stores urine; detrusor muscle
- **Urethra:** about 4 cm (female), 20 cm (male); shorter female urethra = more UTIs

Hoots' tip: Ureters come in twos; the urethra is the one way out.

3 The Nephron



4 Urine Formation

1. **Filtration:** glomerulus into the capsule
2. **Reabsorption:** mostly in the proximal tubule
3. **Secretion:** extra wastes added to the tubule

About 180 L filtered per day → about 1–2 L of urine. About 1 million nephrons per kidney.

ADH	Keep water; less urine
Aldosterone	Keep sodium and water
Renin	Raises blood pressure
EPO	Makes red blood cells

5 Urinalysis

Test	Normal	Abnormal may mean
Color, clarity	Pale yellow to amber; clear	Cloudy: possible infection (or crystals, mucus); red: possible blood (or foods, drugs)
Specific gravity	1.005–1.030	High = dehydration
pH	4.5–8 (about 6)	Diet, infection, medications
Glucose, ketones	Negative	Uncontrolled diabetes, fasting
Protein	Negative or trace	Possible kidney damage
Blood	Negative	Infection, stones, injury
Nitrite, leukocytes	Negative	UTI

Test within 1 hour or refrigerate · Read pads at the stated times · Check expiration and QC

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6 Specimens

Type	Use and key steps
Random	Routine UA, drug screens
First morning	Most concentrated; pregnancy (hCG)
Clean-catch midstream	Culture; clean front to back; start in toilet, catch midstream; sterile cup
24-hour	Discard first void; collect all for 24 hr incl. final void; keep cold
Drug screen	Chain of custody; blue toilet water; check temperature

Label the **container**, not the lid.

7 Disorders

Disorder	Key facts	Disorder	Key facts
Cystitis (UTI)	E. coli; burning, frequency	**CKD**	Diabetes, hypertension; dialysis
Pyelonephritis	Kidney infection; flank pain, fever	**AKI**	Sudden; may reverse
Kidney stones	Severe flank pain; lithotripsy	**Incontinence**	Stress or urge
Glomerulonephritis	Blood and protein in urine	**Retention**	Can't empty bladder
Nephrotic syndrome	Protein loss, edema	**BPH**	Enlarged prostate; weak stream

Tests: UA, culture and sensitivity, BUN, creatinine, eGFR, KUB X-ray, ultrasound, cystoscopy

8 Word Parts

Part	Meaning	Part	Meaning
nephr/o, ren/o	Kidney	**olig/o**	Scanty
pyel/o	Renal pelvis	**poly-**	Many, much
cyst/o, vesic/o	Bladder	**noct/o**	Night
ur/o, -uria	Urine	**lith/o**	Stone
hemat/o	Blood	**py/o**	Pus

9 MA Skills

- Clear collection instructions
- Reagent strips and pregnancy tests with QC
- Gloves and standard precautions
- UTI prevention: fluids, wipe front to back, don't hold urine

10 Quick Compare

Ureters	Two; kidney to bladder	**Urethra**	One; bladder to outside
Cystitis	Bladder infection	**Pyelonephritis**	Kidney infection
Oliguria	Scanty urine	**Anuria / polyuria**	No urine / excessive urine
Nocturia	Waking at night to urinate	**Enuresis**	Bedwetting
Stress incontinence	Leaks with cough or sneeze	**Urge incontinence**	Sudden strong need

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