Urinary System (Ch. 13)  
Medical Terminology

I. Overview → Fig. 13-1  
A. Functions  
   1. Filters blood, removing chemical waste  
   2. Regulates  
      a. fluid volume (blood pressure)  
      b. fluid concentration  
         - pH  
         - chemicals → Ex.: sodium, potassium ion = electrolytes  
B. Anatomically simple, but physiologically complex

II. Kidneys = ren- & nephr-  
A. Located in lumbar region, deep to parietal peritoneum  
B. Frontal section → Know Fig. 13-2, L. side  
   hilum = “notch”  
   pyelo = “renal pelvis” not “pus”  
C. Microscopic functional unit is the nephron – NRF most detail on R. side 13-2  

   nephron = glomerulus + glomerular (Bowman) capsule + renal tubule  
   “ball of yarn” ←

III. Ureters (2)  
A. Kidney → bladder  
B. Not simple gravity feed, but peristalsis

IV. Bladder = cyst/o- & vesic/o  
A. dorsal to pubic symphysis  
B. Sphincters control urination = voiding

V. Urethra (1)  
A. Common passage way for urine & semen in males  
B. Short in female → increased urinary tract infections (UTI)  
C. Opens to exterior via external urethral meatus (= opening)
VI. Clinical

A. Urinalysis (UA) → Fig. 13-9

1. A window into body health for centuries = “liquid biopsy”
   --“Pisse prophets” – Medieval doctors taste, color, odor
   --noninvasive

   **urea** → waste product from protein metabolism
   **glucosuria/glycosuria** → sweet taste in diabetics
   **ketonuria** → distinctive aroma; common in diabetics due to abnormal carbohydrate metabolism
   **bilirubin & urobilinogen** → pigments from RBC destruction: liver function
   **nitrite** → indicate presence of bacteria
   **creatinine, (serum or urine)** → from muscle metabolism
   **hematuria vs. pyuria**

2. If kidneys fail to excrete in urine, substances show up in blood
   **blood urea nitrogen (BUN)** identifies **azotemia (uremia)**
   $\leftrightarrow$ nitrogenous waste (from proteins)
   vs.
   **hematuria**

3. Microscopic findings (Fig. 13-3 & 4)
   -reported per low-power-field (lpf) or high-power-field (hpf)

B. Kidney stones = **nephrolith** or renal **calculi**
   Fig. 13-6

1. Formed by mineral accumulation
2. Not unique to kidney
   -ureterolith –
   -cholelith –
   -cystolith – urinary bladder calculus
   -cholecystolith –
   -sialolith

3. Can be visualized with x-ray (**KUB** = kidneys, ureters, bladder) used as a scout film
   before contrast medium:
   - intravenous pyelogram/urogram (IVP/IVU)
   - retrograde pyelogram (RP)
   - voiding cystourethrogram (VCU or VCUG)

4. Treated by
   --flushing w/ diuretics
   --dissolving
   --crushing (= -tripsy) with ultrasound: extracorporeal shockwave lithotripsy with electricity: intracorporeal lithotripsy (Fig. 13-11)
   --surgery – lithotomy
   or
   endoscopic (Fig. 13-10)
C. Urinary diversion
   - necessary in cases of bladder cancer

   1. noncontinent ileal conduit (Fig. 13-13)
   2. continent urostomy
   3. neobladder (orthotopic bladder)

D. nocturia vs. nocturnal enuresis
   voluntary ← involuntary

E. kidney dialysis
   • hemodialysis – via machine
   • peritoneal dialysis – uses peritoneum

F. Add polydipsia to list
   ← “thirst”