3. **Figure 15–2**: The fibrous membrane surrounding the kidney is the *renal capsule*, the basin-like *pelvis* is continuous with the ureter; a *calyx* is an extension of the pelvis; *renal columns* are extensions of cortical tissue into the medulla. The *cortex* contains the bulk of the nephron structures; the striped-appearing *medullary pyramids* are primarily formed by collecting ducts.


6. **Figure 15–4**: Black arrows: Site of filtrate formation is the glomerulus. Arrows leave the glomerulus and enter glomerular (Bowman's) capsule. Red arrows: Major site of amino acid and glucose reabsorption. Shown going from the PCT interior and passing through the PCT walls to the capillary bed surrounding the PCT (the latter not shown). Nutrients leave the filtrate. Green arrows: At side of ADH action. Arrows (indicating water movement) shown leaving the interior of the collecting duct and passing through the walls to enter the capillary bed surrounding that duct. Water leaves the filtrate. Yellow arrows: Site of aldosterone action. Arrows (indicating Na⁺ movement) leaving the collecting duct and the DCT, and passing through their walls into the surrounding capillary bed. Na⁺ leaves the filtrate. Blue arrows: Site of tubular secretion. Arrows shown entering the PCT to enter the filtrate.

9. A. B. C. D. E. F.
12. Hematuria; bleeding in urinary tract. 2. Ketonuria; diabetes mellitus, starvation. 3. Albuminuria; glomerulonephritis, pregnancy. 4. Pyuria; urinary tract infection. 5. Bilirubinuria; liver disease. 6. (No official terminology); kidney stones. 7. Glycosuria; diabetes mellitus.
13. All reabsorbed by tubule cells. 2. Usually does not pass through the glomerular filter.
14. 1. Chemical buffering; response in less than one second. 2. Adjustment in respiratory rate and depth; response in minutes. 3. Regulation by kidneys; response in hours to days.

Ureters, Urinary Bladder, and Urethra

17. 1. B or urethra. 2. A or bladder. 3. A or bladder. 4. B or urethra. 5. B or urethra; C or ureter.
19. 1. A or cystitis. 2. C or hydronephrosis. 3. F or uremia. 4. E or pyelonephritis. 5. B or diabetes insipidus.

Developmental Aspects of the Urinary System


The Incredible Journey


At the Clinic

22. Anuria; renal dialysis.
23. Perhaps Eddie is a very heavy sleeper and is thus unresponsive to the “urge” to urinate.
24. High sodium content and copious urine volume (although the glucocorticoids can partially take over the role of aldosterone).
25. People who are under prolonged stress activate hypothalamic centers that regulate stress by controlling the release of ACTH by the anterior pituitary. Release of ACTH by the anterior pituitary in turn causes both catecholamines and corticosteroids to be released by the adrenal glands to counteract the stressor by raising blood pressure and blood sugar levels. The elevated blood pressure explains his headache.
26. The alcohol interferes with the action of ADH, which causes the kidneys to retain water. Hence, excessive body water is being lost in urine.
27. Mrs. Rodrigues is in a diabetic coma due to lack of insulin. Her blood is acidic and her respiratory system is attempting to compensate by blowing off carbon dioxide (hence, the elevated breathing rate). Her kidneys are reabsorbing bicarbonate.
28. The test will check for the presence of proteins in the person’s urine, which is a symptom of kidney disease. More importantly, the urine test checks for the presence of drugs in the urine.

Chapter 16 The Reproductive System

Anatomy of the Male Reproductive System

1. Seminiferous tubule → Rete testis → Epididymis → Ductus deferens.