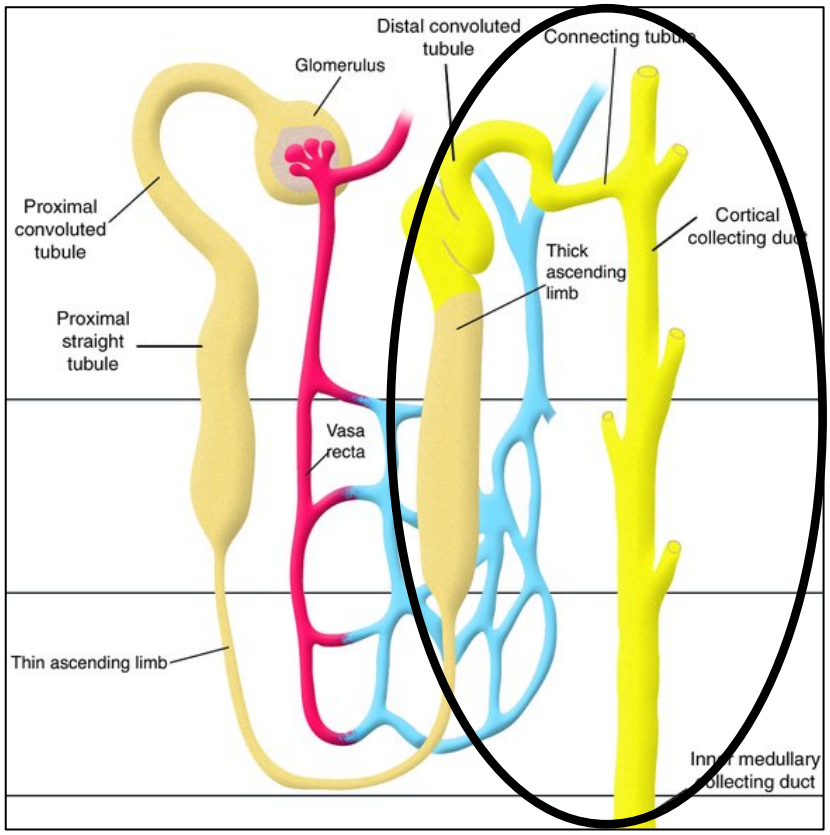
Rose pp. 143-147

Anatomy/physiology

- Four segments of the distal nephron:
  - Distal tubule
  - Connecting segment
  - Cortical connecting tubule
  - Medullary collecting tubule
- Functions of the distal nephron:
  - Maximal [urine]
  - K^+ secretion
  - Maximal acidification
  - Na^{++} conservation

Sodium and water balance-Distal tubule

- Resorbs 5% of filtered NaCl
- Mechanisms:
  - Na^+-Cl^- cotransporter
    - Na^+ moves down [gradient]
    - Driven by Na^+-K^+-ATPase
  - Na^+-H^+ exchanger/Cl^--HCO_3^- exchanger
    - H^+/HCO_3^- move down [gradient]
- Glomerulotubular balance
  - Distal tubular Na+ reabsorption will increase proportionately to an increase in delivery



Questions

1. Conservation of the concentration gradient in the distal nephron is due to:
   a. Passive paracellular transport of calcium down its concentration gradient
   b. Tight junctions between the cells
   c. Na-H+ cotransporters at the luminal membrane
   d. Concentration gradient does not exist in the distal nephron
2. Energy for the Na-H and Cl-HCO3 exchangers is provided by
   a. Na-K ATPase pump on the basolateral membrane
   b. Tubuloglomerular feedback
   c. Carbonic acid movement across the apical membrane
      i. Intracellular carbon dioxide and water combine to form H+ and HCO3- which secrete into the lumen and exchange for Na+ and Cl-. Then the H and HCO3 combine in the lumen to form carbonic acid which is lipid-soluble and moves into the cell to recycle
   d. The NaCl cotransporter on the apical membrane