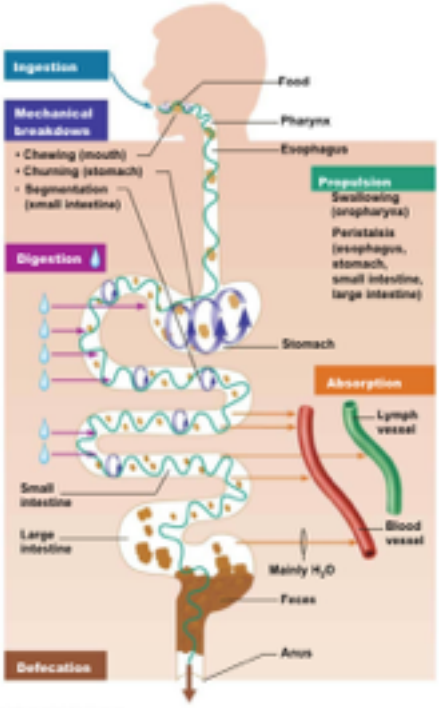
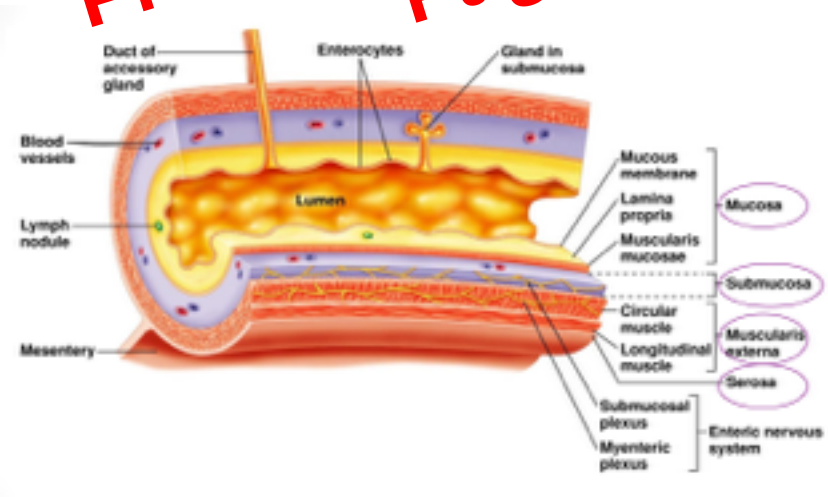


Blood supply
•Splanchnic circulation includes:
•Arteries that branch off aorta to serve digestive organs
•Hepatic, splenic, and left gastric arteries
•Inferior and superior mesenteric arteries

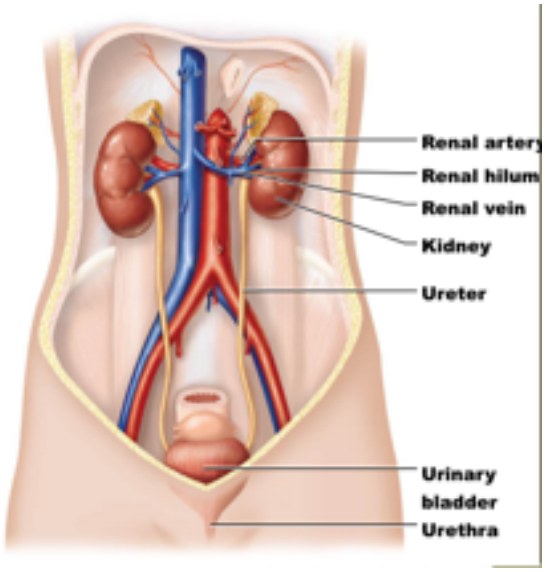
- Hepatic portal circulation
  - Drains nutrient-rich blood from digestive organs
  - Delivers blood to liver for processing

GI wall composition

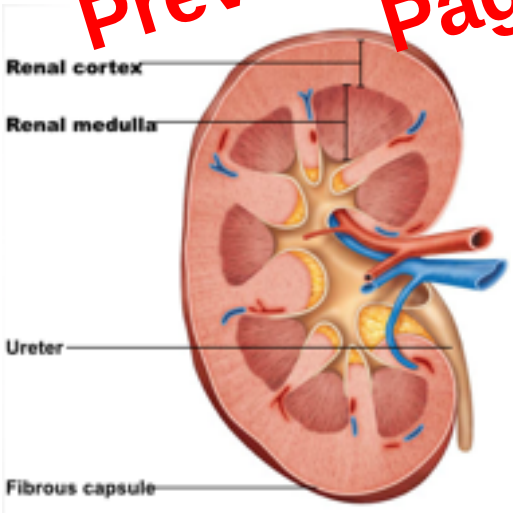


-Digestive organs: Be familiar with the basic processes carried out by the GI system & know the general laminar structure of the wall of the GI tract and the tissues

- Structures of the GI tract
- Mouth, pharynx, and esophagus:
- Mouth

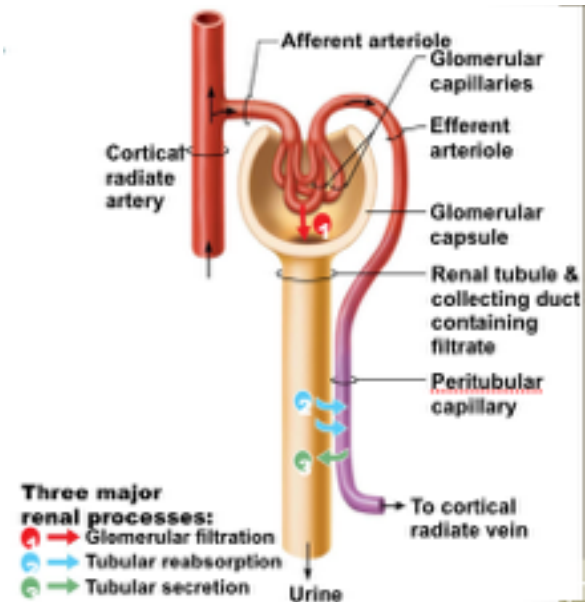


- Kidneys:form urine
  - Gross Anatomy
    - Paired, bean shaped
    - Retroperitoneal
  - Microscopic anatomy
    - Nephron = functional unit
  - Blood supply
    - Renal arteries enter kidney at hilus
    - Renal veins exit at hilus
  - Function is to filter blood



Physiology of Kidneys

- Three processes are involved in urine formation and adjustment of blood composition:
  - Glomerular filtration: produces cell- and protein-free filtrate
    - Outward pressures
      - Forces that promote filtrate formation
      - Hydrostatic pressure in glomerular capillaries (HPgc) is essentially glomerular blood pressure



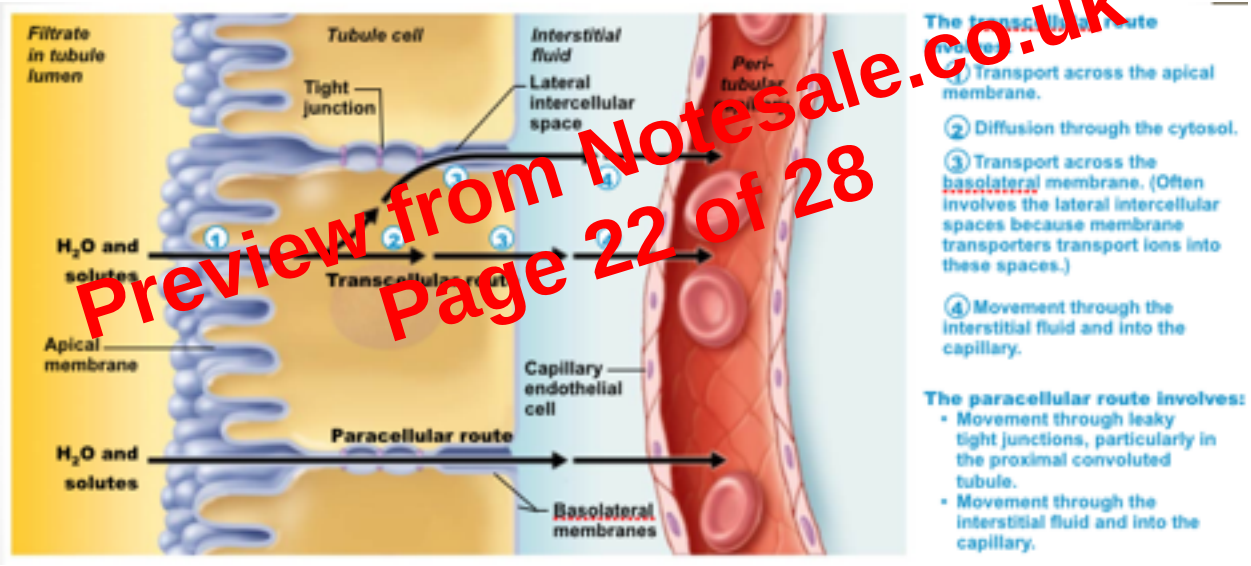
Regulation of Glomerular Filtration

- Intrinsic controls: Renal autoregulation
  - Myogenic regulation
  - Increased mean arterial pressure increases GFR myogenic regulation
    - Response to stretch in afferent arteriole
    - Muscle contracts in response to stretch
    - Increased resistance lowers glomerular capillary pressure
      - Counteracts effects of increased MAP
  - Tubuloglomerular feedback
    - Response to rate of blood flow past macula densa
    - Arteriole contracts
    - Increased resistance lowers glomerular capillary pressure
      - Counteracts effects of increased MAP

- Extrinsic controls: Neural and hormonal mechanisms
  - Sympathetic nervous system
    - When BP is low
    - Norepinephrine (Sympathetic NS) and Epinephrine (adrenal medulla) cause
      - Systemic vasoconstriction, which increases blood pressure
      - Constriction of afferent arterioles, which decreases GFR
      - Blood volume and pressure increases
  - Renin-angiotensin-aldosterone mechanism
    - Main mechanism for increasing blood pressure

- Tubular reabsorption: selectively returns 99% of substances from filtrate to blood in renal tubules and collecting ducts
  - Tubular reabsorption quickly reclaims most of tubular contents and returns them to blood
  - Water and solutes move from renal tubules into peritubular capillaries (returned to blood)
    - Renal tubules to interstitial fluid
  - Most occurs in proximal tubule
    - Selective transport
    - Mostly not regulated

- Transcellular route
  - Solute enters apical membrane of tubule cells
  - Travels through cytosol of tubule cells
  - Exits basolateral membrane of tubule cells
  - Enters blood through endothelium of peritubular capillaries
- Paracellular route
  - Between tubule cells
    - Limited by tight junctions, but leaky in proximal nephron
      - Water, Ca2+, Mg2+, K+, and some Na+ in the PCT move via this route



- Primary active transport of Sodium
  - Na-K ATPase pumps
- Secondary active transport
  - Electro chemical gradient creates ‘push’ for other solutes