

Burton David Rose pp 268-275

Regulation of renal Na⁺ excretion

- Na⁺ excretion varies directly w/ effective circulating volume
- Determined by:
 - Glomerular filtration rate
 - Increases w/ volume expansion and decreases w/ volume depletion
 - Contributes to associated changes in Na⁺ excretion
 - Tubular reabsorption
 - Main adaptive response to fluctuation in effective circulating volume
 - Loop of Henle and distal tubule Na⁺ handling determined by Na⁺ delivery
 - Proximal and collecting tubule Na⁺ handling is neurohormally regulated
- Day-to-day regulation
 - Fine control of Na⁺ excretion is likely through aldosterone
 - Atrial natriuretic peptide may play a role
- Pressure natriuresis
 - Small elevation in blood pressure results in a large elevation in renal Na⁺ excretion
 - Does not require neutrally or humorally mediated sensor mechanisms
 - Rise in medullary interstitial pressure leads to:
 - Diminished movement of reabsorbed solutes/water from interstitium to capillary
 - Pushes fluid into descending limb of loop of henle, counteracting osmotic gradient favoring water movement out of this segment into the hyperosmotic interstitium
 - Release of renal prostaglandins and nitric oxide may contribute to pressure natriuresis
 - Thought to play a role in resetting tubuloglomerular feedback based on macula densa
 - More important in minute-to-minute regulation, not day-to-day

Tubule segment	% filtered NaCl reabsorbed	Determinants of absorption
Proximal tubule	60-65	Na ⁺ -H ⁺ exchange Na ⁺ -glucose cotransport Angiotensin II Norepinephrine Peritubular capillary hemodynamics
Loop of Henle	25-30	Flow-dependent
Distal tubule	5	Flow-dependent
Collecting tubules	4	Aldosterone Atrial natriuretic peptide

Questions

1. The predominant drive for sodium reabsorption in episodes of effective circulating volume depletion is
 - a. Flow-dependent
 - b. Downregulation of pressure natriuresis
 - c. *Neurohormonal regulation*
 - d. Tubuloglomerular feedback loops
2. The stimulation for sodium reabsorption in the collecting tubules is
 - a. Flow dependent
 - b. *Aldosterone*
 - c. Angiotensin II
 - d. Norepinephrine