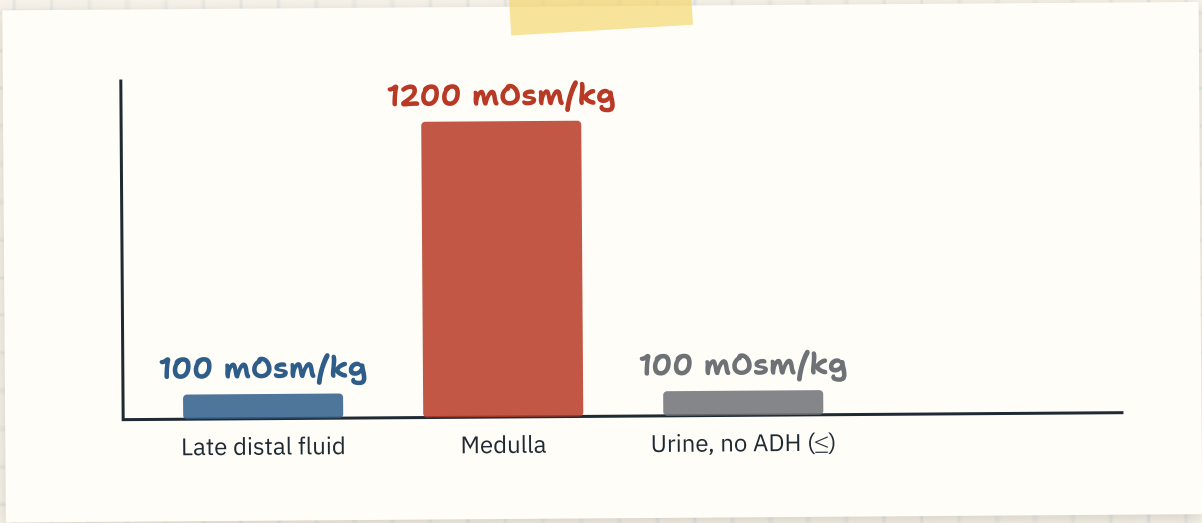
Aldosterone and ADH in one page

Two hormones, two jobs in the distal nephron



Step by step

1. Principal cells reabsorb sodium, secrete potassium and handle water.
2. Aldosterone adds ENaC and Na^+/K^+ pumps: Na^+ goes in, K^+ and H^+ go out.
3. ADH acts through V2, cAMP and aquaporin-2 to let water leave the duct.
4. Without ADH the duct turns waterproof; sodium excretion barely changes.

	Aldosterone	ADH
Acts on	Principal cell (steroid, mineralocorticoid receptor)	Principal cell (V2 receptor, basolateral)
Mechanism	More ENaC and Na^+/K^+ pump, over hours	Gs, cAMP, PKA, aquaporin-2 insertion
Moves	Na^+ in; K^+ and H^+ out	Water out of the duct
Key step	Lumen-negative voltage	Water exits via aquaporins 3 and 4
Too much	Hypertension, low K^+, metabolic alkalosis	Not covered here
Too little	High K^+, normal anion gap acidosis	Aquaporin-2 pulled back; duct waterproof

Aldosterone versus ADH

Rule of thumb

Aldosterone: sodium in, potassium and hydrogen out

ADH: opens water channels

Sodium balance is aldosterone's job

Exam traps

- Sodium balance is aldosterone's job; ADH is the water hormone.
- More ENaC or ROMK means more potassium loss, not retention.
- Aquaporin-2 insertion affects water, not potassium or bicarbonate.
- Too little aldosterone gives high potassium and a normal anion gap acidosis.

Aldosterone and ADH in the distal nephron

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/renal-physiology/aldosterone-adh-distal-nephron

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