

Water Balance



Importance of Water...



- Average adult loses 2 L of water per day.
- **1%** decrease in body water causes **thirst**.
- **5%** decrease causes extreme **pain** and **collapse**.
- **10%** decrease causes **death**.

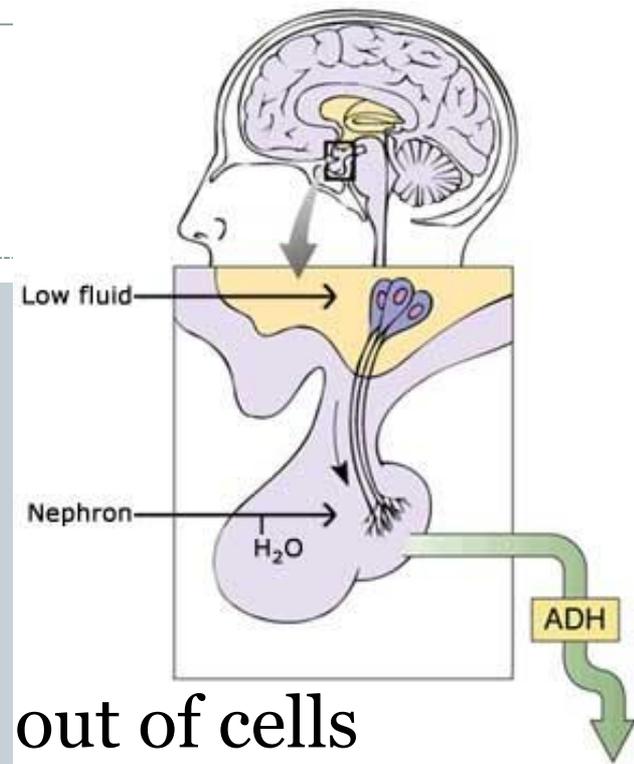


Water vs. Coke



ADH & Low Body Water

- ↓ body water
 - = ↑ blood solutes
 - = ↑ osmotic pressure.
- Water moves into the bloodstream, out of cells
- Hypothalamic **osmoreceptors** shrink.
 - Impulse sent to the posterior pituitary to release ADH.
 - ADH travels to the collecting ducts.
 - Collecting ducts become permeable to water
 - Thirst sensation initiated
- ↑ water reabsorption = ↑ urine concentration

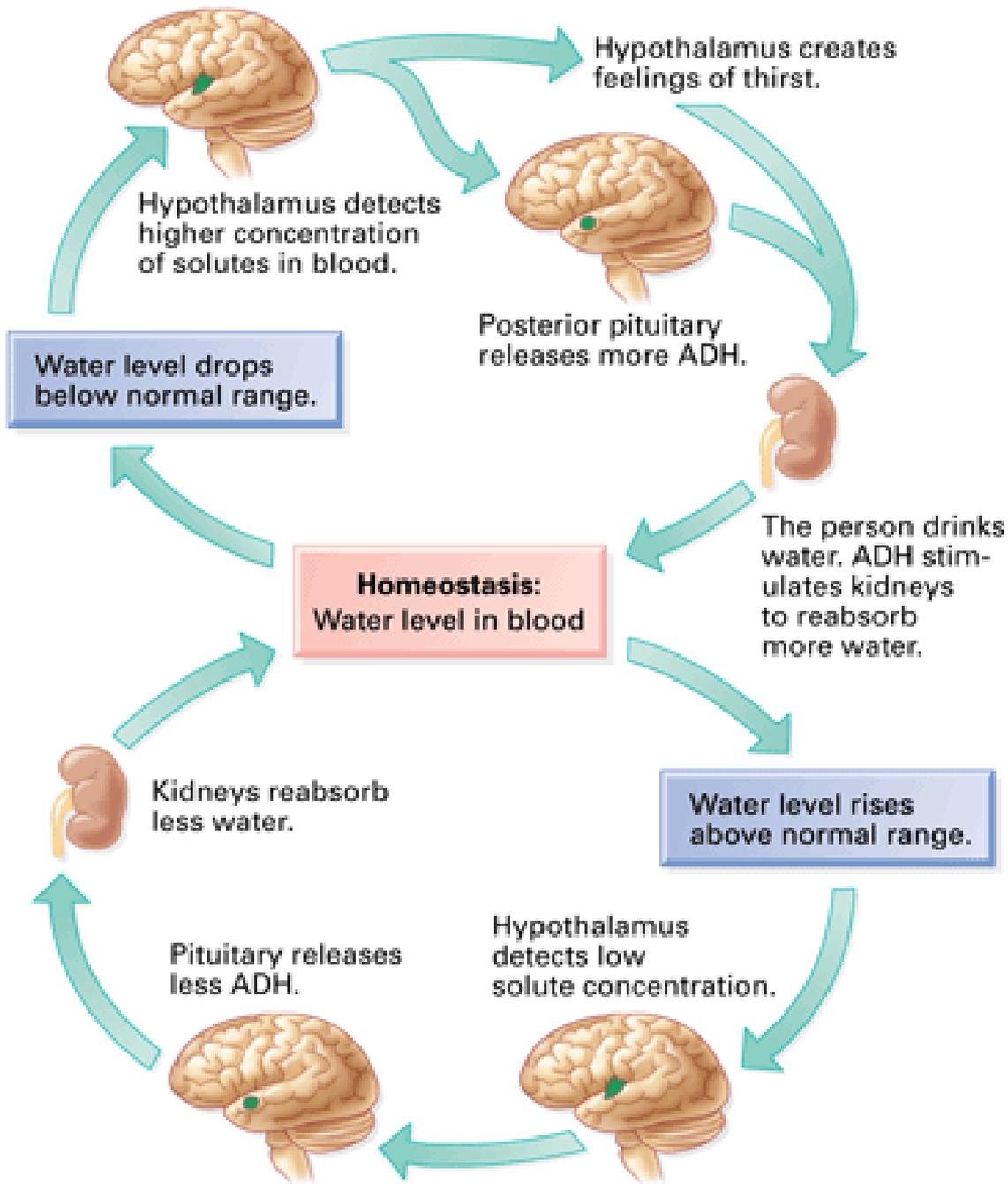


ADH & Low Body Water



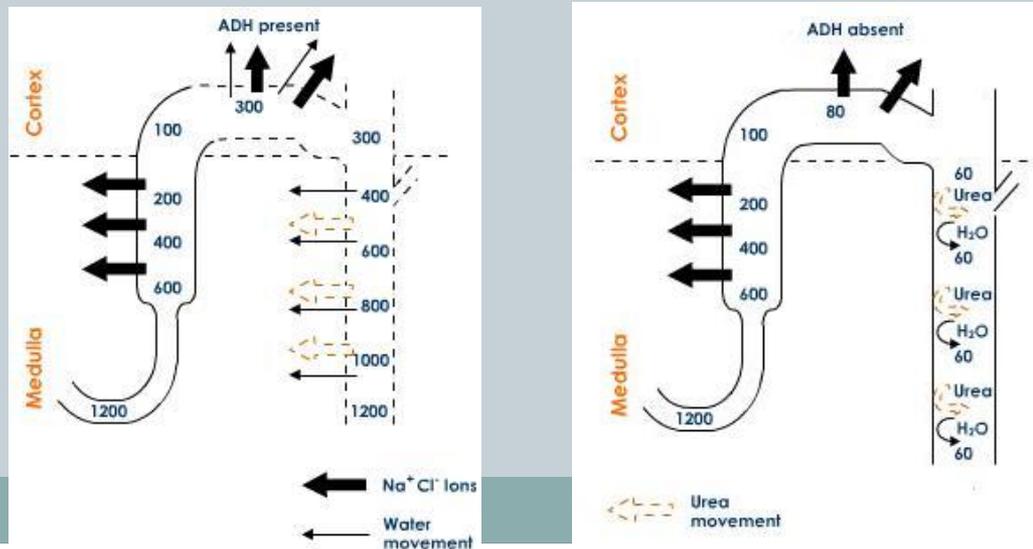
- As water is consumed...
 - Water moves back into the body cells and the hypothalamic osmoreceptors.
 - Osmoreceptors swell and “deactivate”
 - ↓ blood’s osmotic pressure.
 - Less ADH released and less water is reabsorbed.





ADH and the Nephron

- 85% of the water in the primary filtrate is reabsorbed from the proximal tubule.
- With ADH...
 - Collecting duct becomes permeable to water.
- Without ADH...
 - The remaining 15% will not be reabsorbed.



What Urine Can Tell You About Your Health



- [The colour of pee](#)



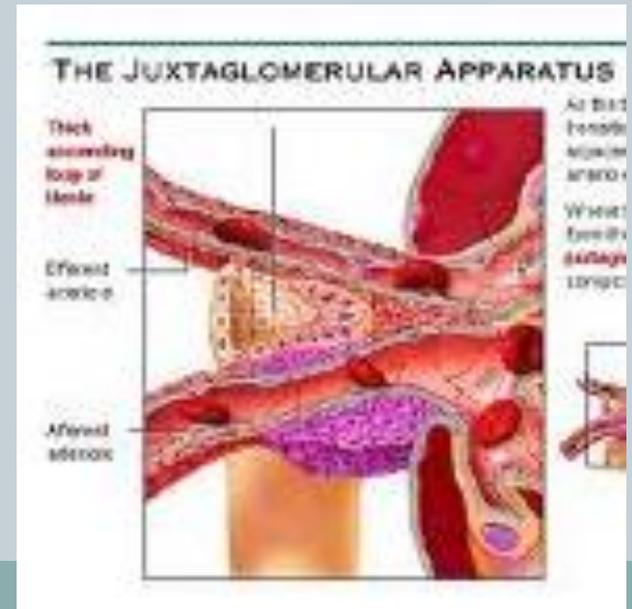
ARE YOU DEHYDRATED? Check Your Urine

1, 2, 3 Well hydrated	1
	2
	3
4, 5 Hydrated but not well	4
	5
6, 7, 8 Dehydrated - You need to drink more	6
	7
	8

Kidneys and Blood Pressure

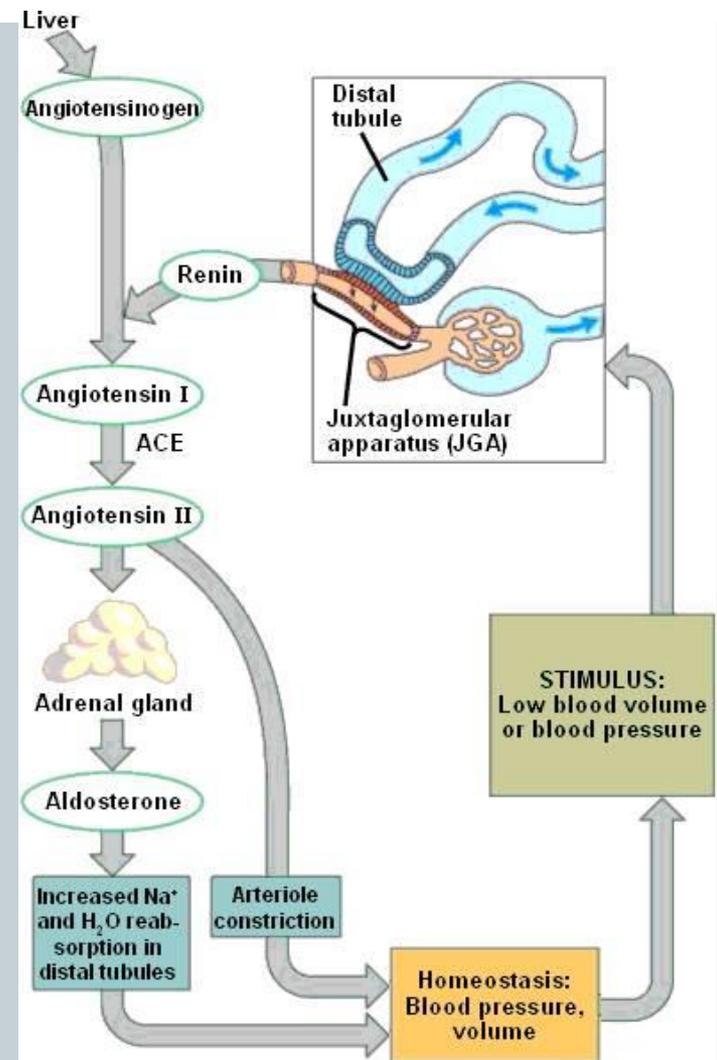


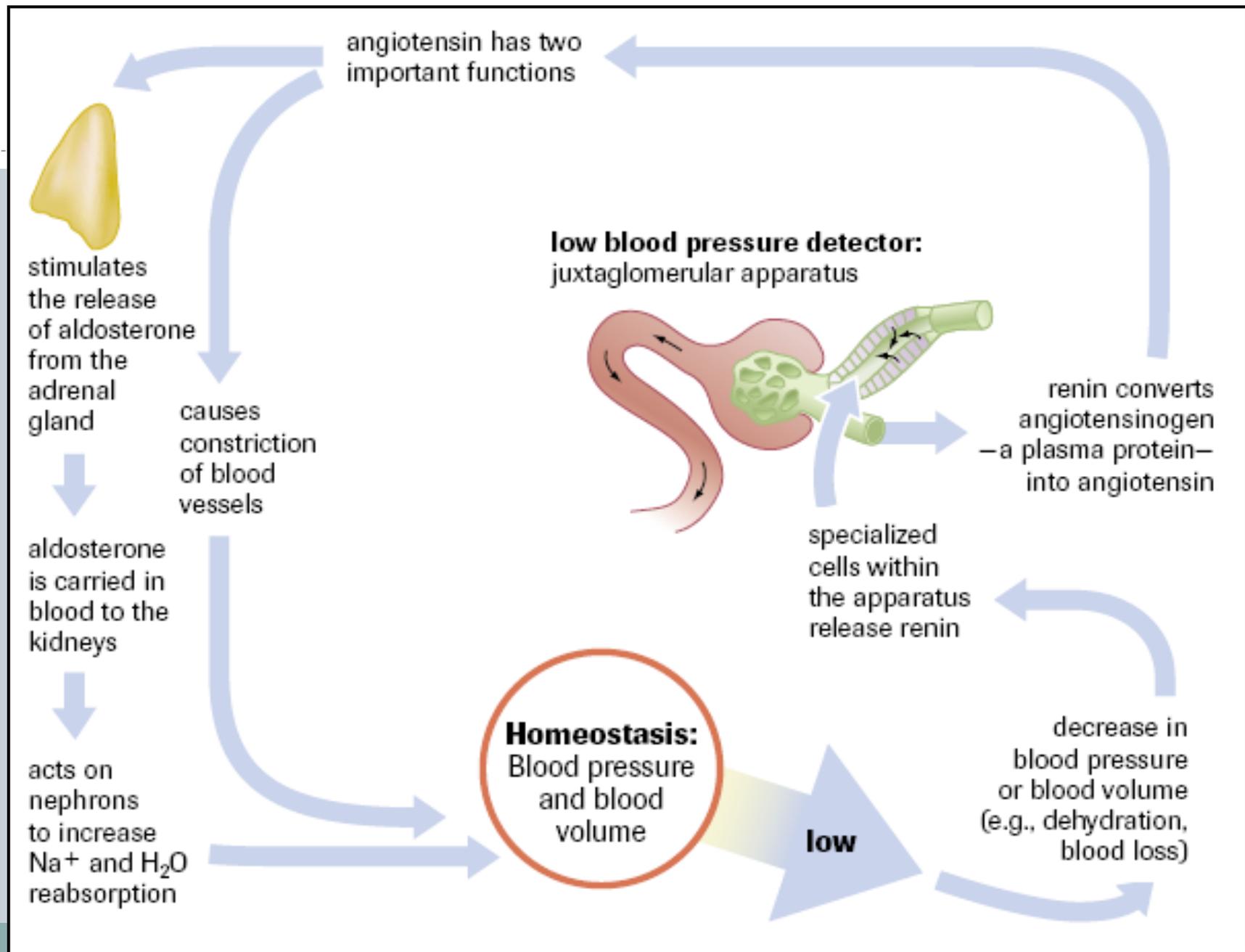
- \uparrow fluid loss = \downarrow blood pressure (BP)
- BP receptors in the **juxtaglomerular apparatus** detects low BP.
 - Releases **renin** which converts **angiotensinogen** into **angiotensin**.
- Functions of angiotensin:
 - **Constriction** of blood vessels.
 - Stimulates release of **aldosterone**.



Kidneys and Blood Pressure

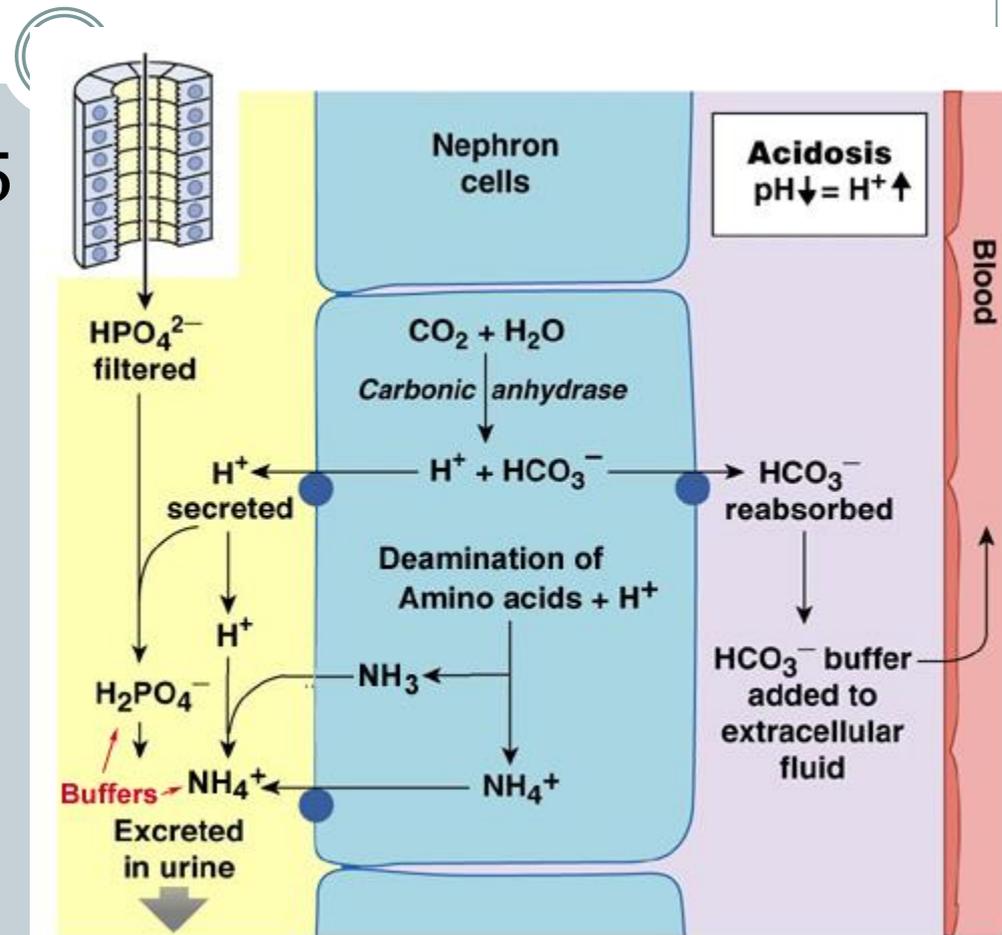
- **Aldosterone** acts on distal tubule to \uparrow Na^+ reabsorption.
 - Produced in the adrenal glands.
- \uparrow NaCl reabsorption
 - = \uparrow osmotic gradient
 - = \uparrow water reabsorption
 - = \uparrow blood pressure





pH Balance

- Body pH between 7.3-7.5
- Buffer system
- Extra H^+ absorbed
- Bicarbonate ions
- Carbonic acid
- CO_2 + water



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