Endo 2: Endocrine control

For each hormone, know …

- *- name and location of secreting organ*
- *- chemical class and receptor type (where given)*
- *- target(s) and main effect on target(s)*
- *- <u>control pathway</u>*

- *Contrast the anterior and posterior pituitary in hormones and mechanisms of release (innervation and vascular supply).*
- *Diagram the control axes/ negative feedback control of anterior pituitary hormones.*

Endocrine homeostatic control of $[Ca^{++}]_{plasma}$

<u>Parathyroid Hormone</u> (PTH) stimulates…

- bone osteoclasts to breakdown Ca-phosphate
- kidneys to reabsorb Ca^{2+}
- intestines to increase Ca^{2+} absorption (through vitamin D activation)

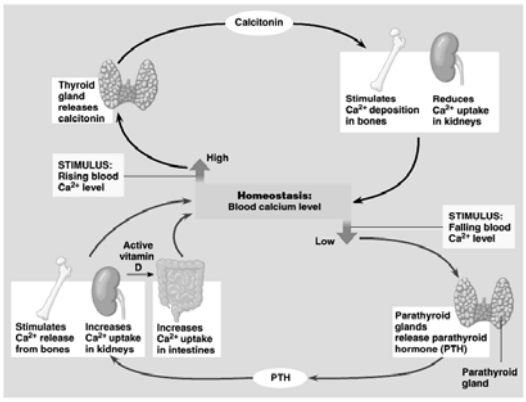
<u>Calcitonin</u>

- osteoblasts to build bone
- kidneys to excrete Ca^{2+}

PTH & calcitonin are <u>peptide hormones</u>.

- What is their basic chemical structure?
- How are they made? stored? released?
- Where are their receptors on target cells?

Calcitonin has effects opposite of PTH effects on bones, kidneys.

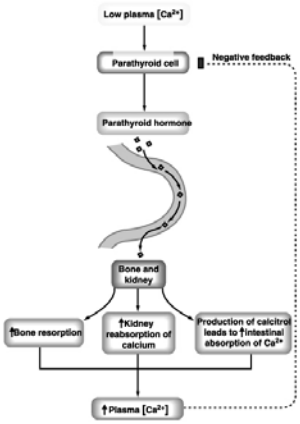


$\Downarrow [Ca^{2+}]_{plasma}$ causes

PTH $\Downarrow$ or $\Uparrow$?

$\Uparrow$ PTH causes $[Ca^{2+}]_{plasma}$ $\Uparrow$ or $\Downarrow$

Represent these on a simple graph.



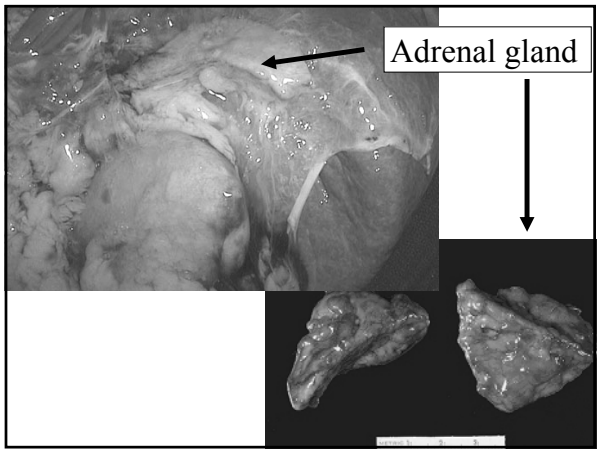
Endocrine homeostatic control of osmolarity: regulation of water volume and [ion]s

- Aldosterone - promotes sodium conservation
- Vasopressin (anti-diuretic hormone)- promotes water conservation
- ANP (atrial natriuretic peptide)- promotes sodium loss, to reduce water vol.

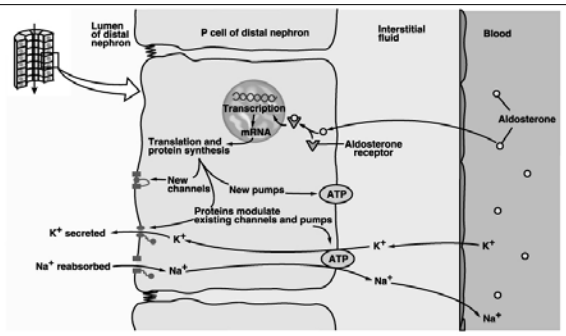
Osmoregulation: Aldosterone

- Induces Na^+ conservation
- Synthesized and released from adrenal cortex
- Steroid hormone
- Acts on kidney cells to increase production of Na^+ membrane channels and Na^+/K^+ pumps

* warning - gross anatomy picture is next



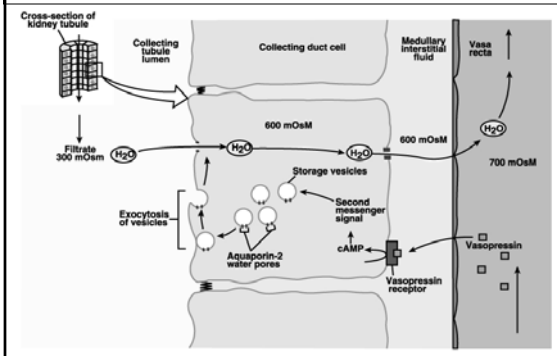
Osmoregulation: Aldosterone



Osmoregulation: Vasopressin (ADH)

- Induces H_2O conservation
- Released from posterior pituitary
- Peptide hormone (stored in vesicles, moves out of cells by exocytosis)
- Activates G protein, cAMP 2nd messenger system in kidney cells to increase water pores (aquaporins) on apical membrane surface.

Osmoregulation: Vasopressin (ADH)



Aldosterone & ADH effects on OsM

- If aldosterone rises OsM

  increases or *decreases*?

- If ADH rises OsM

  increases or *decreases*?