

RAAS Pathway

The Renin-Angiotensin-Aldosterone System “RAAS”

1. RENIN IS RELEASED

Renin is released in response to:

- JG cells in the afferent arterioles sense low MAP
- Macula densa cells sense decreased NaCl in the distal tubules
- SNS activation

2. ANGIOTENSINOGEN IS CONVERTED TO ANGIOTENSIN I

Renin is an enzyme that acts upon angiotensinogen to convert it into angiotensin I

3. ANGIOTENSIN I IS CONVERTED TO ANGIOTENSIN II

Angiotensin Converting Enzyme (ACE) cleaves amino acids from angiotensin I, converting it into angiotensin II

4. ANGIOTENSIN II EXERTS ITS INFLUENCE IN MANY WAYS

- Increases SVR and MAP through vasoconstriction
- Stimulates the reabsorption of sodium in the renal tubules to promote fluid retention
- Stimulates the pituitary to release ADH, which increases fluid retention
- Triggers the thirst center in the brain
- Facilitates the release of norepinephrine, a potent vasoconstrictor
- Stimulates cardiac hypertrophy
- And also...

5. ANGIOTENSIN II TELLS THE ADRENAL CORTEX TO RELEASE ALDOSTERONE

Aldosterone tells the kidneys to increase Na and fluid retention

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1. Renin is released in response to JG cells in the afferent arterioles sensing _____; macula densa cells sensing _____ in the distal tubules; and activation of _____.
2. _____ is converted to angiotensin I by the enzyme _____.
3. _____ cleaves amino acids from _____, turning it into _____.
4. Angiotensin II _____ MAP and _____ SVR.
5. Angiotensin II stimulates the reabsorption of _____ in the renal tubules to _____.
6. Angiotensin II stimulates the pituitary to release _____. This _____ fluid retention.
7. Angiotensin II facilitates the release of _____, a potent vasoconstrictor.
8. Angiotensin II triggers the _____ center in the brain and stimulates cardiac _____.
9. Angiotensin II tells the _____ to release _____, which tells the kidneys to increase _____.
10. The enzyme that converts angiotensinogen into angiotensin I is _____.
11. Increased ADH leads to _____ fluid excretion.
12. Increased aldosterone secretion leads to _____ fluid retention.
13. An ACE-inhibitor such as lisinopril will lead to _____ fluid retention.

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Answer Key

1. Renin is released in response to JG cells in the afferent arterioles sensing **decreased MAP**; macula densa cells sensing **decreased NaCl** in the distal tubules; and activation of **the SNS**.
2. **Angiotensinogen** is converted to angiotensin I by the enzyme **renin**.
3. **Angiotensin converting enzyme (ACE)** cleaves amino acids from **Angiotensin I**, turning it into **Angiotensin II**.
4. Angiotensin II **increases** MAP and **increases** SVR.
5. Angiotensin II stimulates the reabsorption of **sodium** in the renal tubules to **promote fluid retention**.
6. Angiotensin II stimulates the pituitary to release **ADH**. This **increases** fluid retention.
7. Angiotensin II facilitates the release of **norepinephrine**, a potent vasoconstrictor.
8. Angiotensin II triggers the **thirst** center in the brain and stimulates cardiac **hypertrophy**.
9. Angiotensin II tells the **adrenal cortex** to release **aldosterone**, which tells the kidneys to increase **sodium and fluid retention**.
10. The enzyme that converts angiotensinogen into angiotensin I is **renin**
11. Increased ADH leads to **decreased** fluid excretion.
12. Increased aldosterone secretion leads to **increased** fluid retention.
13. An ACE-inhibitor such as lisinopril will lead to **decreased** fluid retention.