Exercise 9: Renal System Physiology: Activity 6: The Effect of Hormones on Urine Formation Lab Report

Pre-lab Quiz Results
You scored 100% by answering 5 out of 5 questions correctly.

1. Which of the following has a role in altering the urine volume and concentration?
   You correctly answered: d. all of these

2. The total solute concentration surrounding the tubule lumen refers to the solutes in
   You correctly answered: b. the interstitial space.

3. Aldosterone is produced in the
   You correctly answered: c. adrenal cortex.

4. ADH promotes the renal reabsorption of
   You correctly answered: a. water.

5. Aldosterone promotes renal reabsorption of __________ and secretion of __________.
   You correctly answered: c. NaCl, potassium
Experiment Results

Predict Question:

Predict Question 1: What will happen to the urine volume (compared with baseline) when aldosterone is added to the distal tubule?
Your answer: b. The urine volume will decrease.

Predict Question 2: What will happen to the urine volume (compared with baseline) when ADH is added to the collecting duct?
Your answer: b. The urine volume will decrease.

Predict Question 3: What will happen to the urine volume and the urine concentration (compared with baseline) in the presence of both aldosterone and ADH?
Your answer: b. The urine volume will decrease and the urine concentration will increase.

Stop & Think Questions:

Why is the concentration in the urinary bladder 100 mOsm?
You correctly answered: c. No ADH has been added to this nephron.

In the presence of aldosterone, what component of the tubule fluid moves out of the distal tubule and into the interstitial space?
You correctly answered: a. NaCl

In the presence of ADH, why did the urinary potassium concentration increase?
You correctly answered: c. The water volume in the urinary bladder is decreased, increasing the concentration of solutes such as potassium.

In the presence of both ADH and aldosterone, why did the urinary potassium concentration increase?
You correctly answered: c. There was more potassium secretion into the distal tubule and more water reabsorption in the collecting duct.

Experiment Data:

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<th>Potassium Conc. in Urine</th>
<th>Urine Volume</th>
<th>Urine Conc</th>
<th>Conc. Grad.</th>
<th>Aldosterone</th>
<th>ADH</th>
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Post-lab Quiz Results
You scored 50% by answering 2 out of 4 questions correctly.

1. If there has been a significant loss of fluid from the body, the kidneys will generate __________ urine.
   Your answer: b. hypo-osmotic
   Correct answer: d. hyperosmotic

2. If you drink a large volume of water, the kidneys will generate __________ urine.
   Your answer: d. hyperosmotic
   Correct answer: b. hypo-osmotic

3. In response to dehydration, ADH will be released from the
   You correctly answered: c. posterior pituitary gland.

4. In response to abnormally low plasma osmolality, aldosterone will increase
   You correctly answered: a. sodium reabsorption along the distal tubule and the collecting duct.
1. How did the addition of aldosterone affect urine volume (compared with baseline)? Can the reabsorption of solutes influence water reabsorption in the nephron? Explain. How well did the results compare with your prediction?
Your answer:
Aldesterone addition made the urine volume decrease. The reabsorption of NaCl in the distal tubule can attract some water with it, making firstly the urine volume decrease and secondly making the urine concentration increase. This is coherent with my prediction.

2. How did the addition of ADH affect urine volume (compared with baseline)? How well did the results compare with your prediction? Why did the addition of ADH also affect the concentration of potassium in urine (compared with baseline)?
Your answer:
The addition of ADH effect urine volume by decreasing it drastically. My prediction was coherent with the results. The addition of ADH affected the potassium concentration in urine because when water is removed, then the concentration of potassium is greater because the water is decreased.

3. What is the principal determinant for the release of aldosterone from the adrenal cortex?
Your answer:
The principal determinanit for aldesterone is the conformation of angiotensin 1 to angiotensin 2 by endothelial cells in the body.

4. How did the addition of both aldosterone and ADH affect urine volume (compared with baseline)? How well did the results compare with your prediction?
Your answer:
When both aldosterone and ADH then urine volume was further decreased and the urine concentrartion increased. My prediction was coherent with my results.

5. What is the principal determinant for the release of ADH from the posterior pituitary gland? Does ADH favor the formation of dilute or concentrated urine? Explain why.
Your answer:
ADH is released from the posterior piutitary gland when there is a decrease in osmlalilty over 1%. This is an indication that there is too little water in the body, and water should not be excreted. ADH is then released to act on the collecting ducts to prevent them from secreting water into the urine.

6. Which hormone (aldosterone or ADH) has the greater effect on urine volume? Why?
Your answer:
ADH has the greatest effect on urine volume, because this is one of the bodys primary regulatory mechanism to regulate too little water in the body, by keeping the water from being secreted in the collecting ducts. This is done to keep homeostasis in the body. Aldosterone remove the NaCl fro mthe distal tubule and with that removal often some water follows, this means that some water will be removed as well, but that is not the primary goal of aldosterone.

7. If ADH is not available, can the urine concentration still vary? Explain your answer.
Your answer:
Yes, because if aldosterone is present then some water will be transported with NaCl and water will follow, so there is not only ADH that ultamately affects the urine volume.

8. Consider this situation: you want to reabsorb sodium ions but you do not want to increase the volume of the blood by reabsorbing large amounts of water from the filtrate. Assuming that aldosterone and ADH are both present, how would you adjust the hormones to accomplish the task?
Your answer:
By aldosterone being present then Nacl and water are being reabsorbed. ADH reabsorbs the water from the collecting tubule making more water present in the blood thereby increasing the volume of the blood. To decrease this one has to remove ADH or at least decrease the amount of ADH and increase the amount of aldosterone.