Influence of fluid intake on urine formation laboratory report essay sample

Environment, Water

1. Urine output will be highest during: water loading

2. Urine osmolality will be lowest during: dehydration

3. Plasma osmolality: increases with dehydration

METHODS AND MATERIALS

1. Dependent variable: urine and plasma values

2. Independent variable: fluid intake

3. Controlled variables: age, gender, and weight; room temperature

4. Subjects were asked to refrain from alcohol and caffeine for a day before the start of the experiment. Explain why this is important. Alcohol and caffeine will increase the amount of urine output

5. What technique was used to measure urine and plasma osmolality? Water consumption measured urine output, and a finger stick. An osmometer was used to check osmolarity.

RESULTS

See Table 3: Urine Production Rate
See Graph 1: Average Daily Urine Production Under Different Hydration States

1. Does dehydration increase, decrease, or not change average urine production rate (L/day)? Decreases production

2. Does water loading increase, decrease, or not affect average urine

production rate (L/day)? Increase production

See Table 4: Osmolality (mosm/L)

See Graph 2: Blood Plasma and Urine Osmolality Under Different Hydration

States

Type in the following AVERAGE urine osmolality (mosm/L)

Normal

Dehydrated

Water Loaded

Urine

Normal

Dehydrated

Water Loaded

Subject 1

578

1190

187

Subject 2

593

1170

182

Subject 3

633

1210

199

Average

601

1190

189

3. Does dehydration increase, decrease, or not change average urine osmolality (mosm/L)? Increases

4. Does water loading increase, decrease, or not change average urine osmolality (mosm/L)? Decreases

Type in the following AVERAGE plasma osmolality (mosm/L)

Normal

Dehydrated

Water Loaded

Plasma

Normal

Dehydrated

Water Loaded

Subject 1

299

294

280

Subject 2

293

292

285

Subject 3

292

296

287

Average

295

294

284

5. Does dehydration increase, decrease, or not change average plasma osmolality (mosm/L)? Doesn't change

6. Does water loading increase, decrease, or not change average plasma osmolality (mosm/L)? Doesn't change

DISCUSSION

1. State whether dehydration results in production of a concentrated or dilute urine. Concentrated urine

2. State whether water loading results in production of concentrated or dilute urine. Dilute urine

3. Describe how ADH secretion during dehydration changes urine production and osmolality. The water is reabsorbed more, therefore urinates less, and increases osmolarity.

4. Describe how ADH secretion during water loading changes urine production and osmolality. There is excess water, therefore more urination, and decreased osmolarity.

5. Describe how ADH secretion maintains plasma osmolality levels during dehydration and water loading. Based on the state of hydration, ADH secretion will either assist or take away in reabsorption of water. This helps maintain normal osmolarity whether or not were hydrated (to an extent).

6. Explain why in this experiment you did not see significant changes in plasma osmolality during dehydration or water later loading. The ADH secretion maintains plasma osmolarity regardless of hydration levels.

7. Discuss why maintaining plasma osmolality within normal limits is important. Normal plasma osmolarity cycles and wastes using urine most efficiently. This process involves both waste and nutrients.

8. Restate your predictions that were correct and give the data from your experiment that supports them. Restate your predictions that were not correct and correct them, giving the data from your experiment that supports the correction. Everything was correct, except the fact that plasma osmolarity does not significantly change based on hydration level because of the secretion of ADH.

APPLICATION

1. Drinking alcoholic or caffeinated beverages increases urine output more than drinking an equivalent amount of water.

How do you think these beverages affect ADH secretion?
These beverages drop the amount of ADH secretion, meaning less reabsorption in the kidneys and an uneven amount of urine leaving the body. Would urine osmolality be increased or decreased?
Increased

2. Explain why someone with diabetes insipidus must drink more water than normal. There is an excessive amount of water loss in someone with diabetes insipidus. The diabetic kidneys do not keep the proper amount of water in the body, and the water is lost in the form of Dilute Urine.

3. Explain what happens to plasma osmolality when you give a severely dehydrated person large amounts of pure water. The plasma osmolarity would decrease because of the dilution of the newly dissolved molecules by the " pure water".