Exercise 9: Renal System Physiology: Activity 5: Reabsorption of Glucose via Carrier Proteins Lab Report

Pre-lab Quiz Results
You scored 100% by answering 4 out of 4 questions correctly.

1. Renal processing of plasma glucose does *not* normally include
You correctly answered: b. secretion.

2. How does antidiuretic hormone (ADH) affect the renal processing of plasma glucose?
You correctly answered: c. ADH has no direct effects on renal processing of plasma glucose.

3. Glucose reabsorption in the nephron includes
You correctly answered: d. secondary active transport along the apical membrane of proximal tubule cells.

4. Because carrier proteins are required to move glucose from the lumen of the nephron into the interstitial spaces, which of the following statements is *false*?
You correctly answered: d. The number of glucose carriers in a nephron can be altered as needed by the body.
Experiment Results

Predict Question: What will happen to the glucose concentration in the urinary bladder as glucose carriers are added to the proximal tubule?
Your answer: b. The glucose concentration will decrease.

Stop & Think Questions:
Why is the glucose concentration the same in both Bowman's capsule and the urinary bladder?
You correctly answered: b. Glucose cannot be reabsorbed in the absence of carriers.

Is a transport maximum reached in these experiments?
Your answer: a. yes
Correct answer: b. no

Experiment Data:

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Post-lab Quiz Results
You scored 100% by answering 3 out of 3 questions correctly.

1. Glucose carrier proteins are located in which region of the nephron?
   You correctly answered: b. the proximal convoluted tubule

2. If the concentration of glucose in the filtrate exceeds the transport capacity of the carrier proteins, then
   You correctly answered: d. a transport maximum has been reached.

3. Why does glucose appear in the urine of untreated diabetic patients?
   You correctly answered: c. An excessive amount of glucose is present in their filtrate.
Review Sheet Results

1. What happens to the concentration of glucose in the urinary bladder as the number of glucose carriers increases?
   Your answer:
   As the glucose carriers increases the concentration in the urinary bladder decreases. This is due to more glucose being reabsorbed by active transport at the apical membrane and then facilitated diffusion by the GLUT 1 receptors in the basolateral membrane of the distal tubule.

2. What types of transport are utilized during glucose reabsorption and where do they occur?
   Your answer:
   First the glucose enter the apical membrane by GLUT 2 transport carrier by secondary active transport and leaves through the basolateral membrane by the GLUT 1 transport protein by facilitated diffusion.

3. Why does the glucose concentration in the urinary bladder become zero in these experiments?
   Your answer:
   The glucose levels in the filtration system does not reach the threshold and there is more available transportprotein than there are glucose. If the glucose levels in filtration reaches a certain level of glucose then the transport proteins becomes filled up with glucose and the additional glucose is secreted in urine.

4. A person with type I diabetes cannot make insulin in the pancreas, and a person with untreated type II diabetes does not respond to the insulin that is made in the pancreas. In either case, why would you expect to find glucose in the person's urine?
   Your answer:
   Type 1 diabetes cannot make insulin in the pancreas and has an elevated level of glucose in the blood. This leads to an increase level of glucose in the filtration system and glucose transport proteins threshold is completely filled up, making the excessive glucose being secreted in the urine. A person with diabetes type 2 does not respond to the insulin being made, making it glucose in the system, increasing the levels of glucose making more glucose being secreted.