

Pathophysiology lab questions

Laboratory evaluation of carbohydrate metabolism

1. Is it possible that someone:
 - a) has glucosuria at a serum glucose concentration of 5 mmol/l?
 - b) does not have glucosuria at a serum glucose concentration of 15 mmol/l?

2. A 15-year-old girl has been losing weight in spite of having a good appetite, and she feels tired lately. She has been admitted to a hospital for vomiting, being dizzy and disoriented. Laboratory findings:
 - urine glucose: strongly positive
 - ketone bodies: positive
 - blood glucose: 28.5 mmol/l
 - blood pH: 7.1
 - serum K⁺: 5.4 mmol/lWhat is your diagnosis, and what is to be done with her?

3. A 56 year-old man who used to be healthy complains of polyuria. Laboratory findings:
 - fasting blood glucose: 7.3 mmol/l,
 - fasting blood glucose a week later: 7.6 mmol/l.What is your diagnosis, and what would you do with him?

4. A 60 year-old woman, weighing 90 kg. Fasting blood glucose concentration: 6.9 mmol/l. Neither glucose nor ketone bodies are found in her urine. The results of oral glucose tolerance test:
 - fasting value: 6.4 mmol/l
 - 2h value: 8.5 mmol/lWhat is your diagnosis, and what would you advise to her?

5. Laboratory findings of a person:
 - fasting blood glucose: 6.2 mmol/lOral glucose tolerance test was performed on another occasion:
 - fasting value: 6.3 mmol/l
 - 2h value: 6.5 mmol/l.What is the diagnosis, and what is the clinical significance of it?

6. What are your options to check the glucose metabolism of your diabetic patient, to decide if the current treatment needs to be changed or not?

7. A diabetic patient treated with insulin has a fasting blood glucose concentration of 6.4 mmol/l. No glucose was detected on the morning of the examination. The Hb-A_{1c} level is 10 % (normal value: 3–6 %). Do you think the control of glucose concentration was acceptable in the last 1–2 months?

8. A type 1 diabetic man has been eating very little for the last couple of days, due to a febrile illness, so he decided to stop administering his insulin. He checked his blood glucose, because he felt worse and worse, and was surprised to see, that it was more than 20 mmol/l. What is the explanation?

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9. A diabetic man treated with insulin skipped his late evening meal before going to bed, without any change in his insulin administration. He has been sweating a lot during the night, and glucose has been detected in his urine in the morning.
What is the explanation for this?
10. A man with type 1 diabetes, cooperating very well with his physician, keeps his diet and insulin administration very precisely. He is an employee of a bank, and currently attends a team building training, a several-day-long survival tour causing significant physical exertion. The man, who is known to be reserved, starts shouting and quarreling with his coworkers, then he begins to sweat, quiver and develops cramps.
What do you think is the explanation of his behaviour?
11. A woman was admitted to the hospital with the complaint of recurring seizures. Her fasting blood glucose level is 2.7 mmol/l.
What can cause these symptoms? What tests would you perform to establish the diagnosis?