PhysioEx Lab Report

Exercise 4: Endocrine System Physiology

Activity 2: Plasma Glucose, Insulin, and Diabetes Mellitus

Name: Kyle Svarczkopf

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Pre-lab Quiz Results

You scored 100% by answering 5 out of 5 questions correctly.

1. Which of the following statements is *false*?

   You correctly answered: Insulin is a hormone secreted into the stomach to aid with starch digestion.

2. Which of the following statements is *true*?

   You correctly answered: All of these statements are true.

3. A diagnosis of type 1 diabetes mellitus implies that

   You correctly answered: the pancreas is not producing sufficient insulin.

4. A diagnosis of type 2 diabetes mellitus implies that

   You correctly answered: the cells of the body are unresponsive to circulating insulin.

5. Glucagon is a hormone

   You correctly answered: that opposes the action of insulin.

Experiment Results

Predict Question

1. Predict Question: To measure the amount of plasma glucose in a patient sample

   Your answer: the optical density of the sample will be measured and the glucose concentration will be extrapolated from the glucose standard curve.

Stop & Think Question

1. Why does the color in the tubes vary?

   You correctly answered: The tubes contain different amounts of glucose.

Experiment Data

	Tube	Optical Density	Glucose (mg/deciliter)
Part 1	1	0.30	30
	2	0.50	60
	3	0.60	90
	4	0.80	120
	5	1.00	150
Part 2	1	0.73	105
	2	0.79	115
	3	0.89	133
	4	0.83	123
	5	0.96	145

Post-lab Quiz Results

You scored 100% by answering 6 out of 6 questions correctly.

1 A male patient has had successive fasting plasma glucose readings of 115, 110, and 122 mg/dl. The healthcare provider will inform him that

You correctly answered: he appears to have impairment or borderline impairment of insulin-mediated glucose uptake by his cells.

2 To obtain an accurate spectrophotometric measurement of the glucose concentration in the sample

You correctly answered: heparin is added to prevent blood clots.

3 In the spectrophotometric assay used in this experiment, the _____ as the glucose concentration in the sample increases.

You correctly answered: optical density increases.

4 A female patient has had successive fasting plasma glucose readings of 130, 140, and 128 mg/dl. The healthcare provider will inform her that

You correctly answered: she has developed diabetes.

5 To maintain plasma glucose homeostasis

You correctly answered: insulin-mediated transport of glucose into cells acts as negative feedback when plasma glucose levels rise.

6 A laboratory technician withdraws a blood sample from a vein in your upper arm knowing that

You correctly answered: the plasma glucose concentration will be the same in both the arm vein and the index finger.

Review Sheet Results

1 What is a glucose standard curve, and why did you need to obtain one for this experiment? Did you correctly predict how you would measure the amount of plasma glucose in a patient sample using the glucose standard curve?

Your answer:

The glucose standard curve illustrates the relationship between glucose concentration and optical density to determine the amount of glucose circulating in the blood and diagnose diabetes mellitus. Ineeded to obtain a curve to compare the various samples from the patients and to diagnose them properly. My prediction was correct and correlated with my results.

2 Which patient(s) had glucose reading(s) in the diabetic range? Can you say with certainty whether each of these patients has type 1 or type 2 diabetes? Why or why not?

Your answer:

Patient 5 can be diagnosed with diabetes since both FPG values were greater than 126 mg/dl. Patient4's results indicate borderline impairment of insulin-mediated glucose uptake by cells since the FPG values were in the range of 110 - 126 mg/dl. Patients 2 and 3 had one FPG value that was either borderline or could be considered diabetic. I cannot say with certainty whether each of the patient shave type 1 or 2 diabetes because there is no indication with the administered test. Therefore, more tests would need to be conducted.

3 Describe the diagnosis for patient 3, who was also pregnant at the time of this assay.

Your answer:

Patient 3 has gestational diabetes, which typically disappears after pregnancy.

4 Which patient(s) had normal glucose reading(s)?

Your answer:

Patient 1.

5 What are some lifestyle choices these patients with normal plasma glucose readings might recommend to the borderline impaired patients?

Your answer:

Patients should monitor their sugar intake and check their glucose levels regularly. They could also try to exercise more and try to follow a diet.