

Thought Lab 13.1: Blood Glucose Regulation and Homeostasis

Purpose: How do levels of blood glucose fluctuate throughout the day in someone with diabetes compared to someone without diabetes?

Procedure

Compare the following blood glucose concentration data provided for Maria and Tamika. One of these young women has diabetes. Blood glucose concentrations were monitored over 15 h for both. Both women ate identical meals at the same times, and got equal amounts of exercise at the same times. Neither is presently taking insulin.

Maria's and Tamika's Blood Glucose Levels over 15 h

Event/Time	Blood Glucose Concentration (mmol/L)	
	Maria	Tamika
Wake up: 8:00 A.M.	4.0	10.0
1 h after breakfast: 9:00 A.M.	7.0	14.0
Pre-lunch: 12:00 noon	4.5	10.0
2 h after lunch: 2:00 P.M.	6.0	15.0
Mid-afternoon: 3:00 P.M.	4.5	10.0
1 hr after vigorous exercise: 4:00 P.M.	4.0	4.0
Pre-supper: 6:00 P.M.	4.5	9.0
1 h after supper: 7:00 P.M.	6.5	18.0
Bedtime: 11:00 P.M.	4.5	12.0

Source: Data provided by Dr. Edmund A. Ryan, Professor of Medicine, University of Alberta, Medical Director of the Clinical Islet Cell Transplant Program.

Analysis

- Plot both sets of data on the same graph and draw a line of best fit for each. Label your graph appropriately.
- A healthy range for blood glucose is between 4.5–5.0 mmol/L. In general, a person with moderate diabetes would take an insulin shot if the blood glucose level went above 13–15 mmol/L. On your graph, indicate which woman is diabetic and which is not. Write a paragraph to explain your answer.

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HANDOUT		

6. During exercise, Tamika's blood glucose drops dramatically. What could she do to help raise her blood glucose to a healthy range?