AGENDA for 10/31/13

- AGENDA:
  1. 2.1.1: Diagnosing Diabetes
     - Part 2 – Glucose Tolerance Testing
     - Part 3 – Insulin Level Testing
- OBJECTIVES:
  1. Make an initial diagnosis of diabetes and characterize the disease
  2. Perform simulated glucose tolerance and insulin level testing in patients
- HOMEWORK:
  - Due **end of period**
    1. 2.1 Key Term Crossword
  - Due **Fri, 11-01**
    1. 2.1.1. Activity Packet

Activity 2.1.1. – Diagnosing Diabetes

Activity Objectives – 2.1.1.

1. Make an initial diagnosis of diabetes and characterize the disease
2. Perform simulated glucose tolerance and insulin level testing in patients

Essential Questions

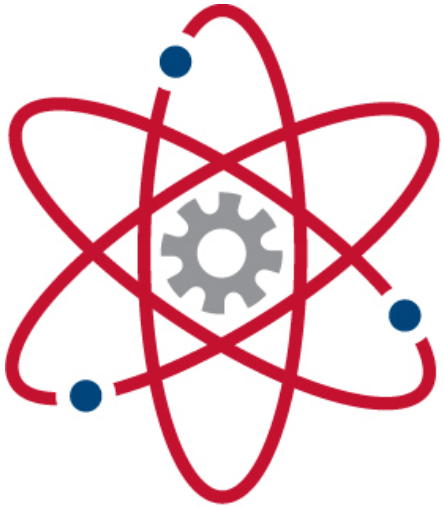
1. What is diabetes?

Essential Questions

1. What is diabetes?
2. How is glucose tolerance testing used to diagnose diabetes?
3. How does the development of Type 1 and Type 2 diabetes relate to how the body produces and uses insulin?

2.1 Key Terms

Glucagon	A protein hormone secreted by pancreatic endocrine cells that raises blood glucose levels; an antagonistic hormone to insulin.
Glucose Tolerance Test	A test of the body's ability to metabolize glucose that involves the administration of a measured dose of glucose to the fasting stomach and the determination of blood glucose levels in the blood or urine at intervals thereafter and that is used especially to detect diabetes.
Homeostasis	The maintenance of relatively stable internal physiological conditions (as body temperature or the pH of blood) in higher animals under fluctuating environmental conditions.
Hormone	A product of living cells that circulates in blood and produces a specific, often stimulatory, effect on the activity of cells that are often far from the source of the hormone.
Insulin	A protein hormone secreted by the pancreas that is essential for the metabolism of carbohydrates and the regulation of glucose levels in the blood.
Negative Feedback	A primary mechanism of homeostasis, whereby a change in a physiological variable that is being monitored triggers a response that counteracts the initial fluctuation.
Positive Feedback	Feedback that tends to magnify a process or increase its output.
Type 1 Diabetes	Diabetes of a form that usually develops during childhood or adolescence and is characterized by a severe deficiency of insulin, leading to high blood glucose levels.
Type 2 Diabetes	Diabetes of a form that develops especially in adults and most often obese individuals and that is characterized by high blood glucose resulting from impaired insulin utilization coupled with the body's inability to compensate with increased insulin production.



PROJECT LEAD THE WAY

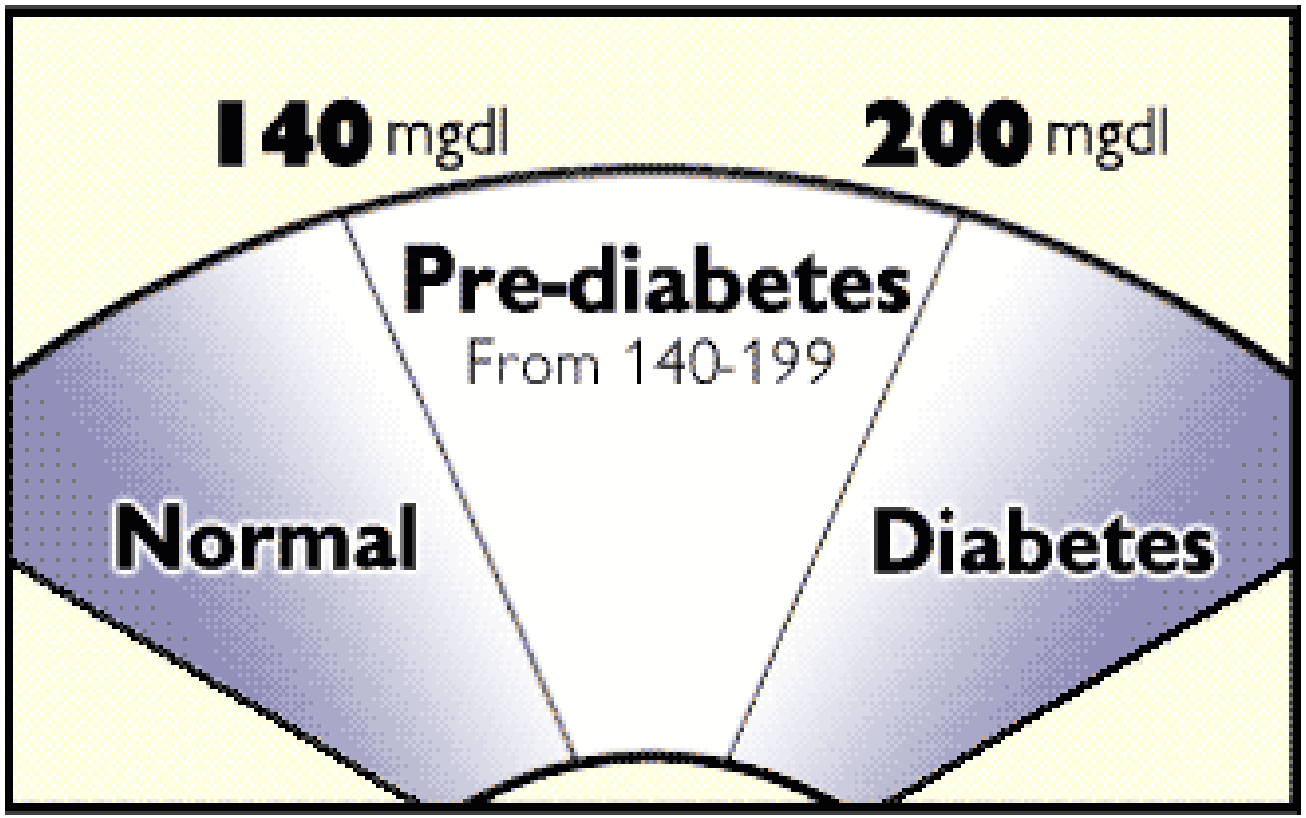
PLTW

Igniting imagination and innovation through learning.

Glucose Tolerance and Insulin Level Testing

Glucose Tolerance Testing (GTT)

Glucose Tolerance Testing (GTT)



Oral Glucose Tolerance Test

Glucose Tolerance Testing (GTT)

1. After fasting (about 8-10 hours before testing), the patient drinks a glucose solution
2. Blood is drawn at specific time intervals (like 0 min, 30 min, 60 min and so on) to monitor the levels of *blood plasma (BP) glucose*
3. The results are analyzed. High glucose levels throughout all time intervals may indicate a diabetic condition.

Insulin Level Testing

No food or drink 8 to 12 hours prior to test

Drink glucose

Blood is tested two hours later

Insulin Level Testing

1. Works much the same way as GTT.
2. After fasting (about 8-10 hours before testing), the patient drinks a glucose solution
3. Blood is drawn at specific time intervals (like 0 min, 30 min, 60 min and so on) to monitor the levels of *insulin*.
4. Many times, both tests are done together (from the same BP sample.
5. The results are analyzed. Insulin levels are combined with glucose levels to give an overall diagnosis.

2.1.1. Conclusion Question

1. Describe how Glucose Tolerance Testing can be used to diagnose diabetes.
2. Explain why insulin injections are not the course of treatment for all diabetics.
3. Explain how lifestyle choices can impact a person's risk for developing diabetes.
4. What do you think it means if doctors say that a person is "pre-diabetic"?
5. Using information from this activity, explain the basic relationship between insulin and glucose.

Due Fri, 11-01

2.1.1 Activity Checklist

1.	2.1.1. Part 1 – Diabetes Definition/Notes on Medical Histories (NB)	2
2.	2.1.1. Graphing Practice using Excel (stamp)	2
3.	2.1.1. Part 2 – GTT Glucose Level Table (LB)	3
4.	2.1.1. Part 2 – Glucose Tolerance Testing Sheet (stamp)	1
5.	2.1.1. Part 2 – Glucose Level Graph (printed)	5
6.	2.1.1. Part 3 – Insulin Level Table (LB)	3
7.	2.1.1. Part 3 – Insulin Level Graph (printed)	1
8.	2.1.1. Part 3 – Insulin Testing Sheet (stamp)	5
9.	2.1.1. Complete Medical History for Anna Garcia (LB)	1
10.	2.1.1. Type I vs. Type II Diabetes Venn Diagram (LB)	3
11.	2.1.1. Conclusion Questions (NB)	2

Total = 28

2.1.1. Activity Directions

2.1.1. Part 1 – Patient Histories

1. Write a 1-sentence definition of diabetes in your NB
2. Review Anna Garcia's medical histories
3. Review Patients A and B's medical histories
4. Take notes in your NB

2.1.1. Graphing Practice

1. Review the Graphing Resource Sheet (on class website)
2. Go to the Graphing Tutorial: http://spreadsheets.about.com/od/excelcharts/ss/line_graph.htm
3. Open MS Excel, and complete the tutorial.
4. Do not print. Show Mr. Hwang the completed graph for a stamp.

2.1.1. Part 2 – Glucose Tolerance Testing

1. Read the curriculum file for detailed directions for the glucose tolerance testing (GTT) lab
2. Show the Testing Sheet with the plasma samples and test strips to Mr. Hwang for a stamp
3. Copy the chart onto your LB, and fill in your data
4. Create an Excel graph of your results (all 3 patients should be on 1 graph)
5. Print out a copy of the graph (1 per person in the group)

2.1.1. Part 3 – Insulin Level Testing

1. Read the curriculum file for detailed directions for the insulin level testing lab
2. Show the Testing Sheet with the plasma samples and insulin indicator to Mr. Hwang for a stamp
3. Copy the chart onto your LB, and fill in your data
4. Create an Excel graph of your results (all 3 patients should be on 1 graph)
5. Print out a copy of the graph (1 per person in the group)

2.1.1. Medical History & Venn Diagram

1. Complete Anna Garcia's medical history (in your NB) by writing your findings under FOLLOW-UP/DIAGNOSIS and EXPLANATION OF SYMPTOMS
2. In your LB, draw a Venn Diagram to display the similarities and differences between diabetes type I and type II. Include:
    1. Labels
    2. Symptoms
    3. Diagnosis and Testing
    4. Causes & Risk Factors
    5. Treatments
3. A good resource on the differences between type I and II diabetes: http://kidshealth.org/kid/videos/indiabetes_vd.html