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Lab 8: Glucose

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Purpose: For this lab we will need to fast and perform a glucose test. The glucose tolerance test assesses the body's ability to respond to excess glucose. The changes in the blood glucose level following glucose ingestion are markedly different between the normal and diabetic person. In the normal person, the blood glucose label rises from about 90mg% to around 149mg% in 1 hour and then falls back to normal within 3 hours or even below normal due to excess insulin release by the pancreas. The diabetic person shows a hyperglycemic response in which the blood glucose level rises from about 120-160mg% to as high as 300mg% and then slowly falls to the fasting diabetic level after 5-6 hours. The diabetics abnormal response is caused by the inability of the pancreas to secrete additional insulin in response to elevated blood glucose levels.

Procedure: OBJ

#1) Six students volunteers will be selected for this experiment. These subjects should report to the lab in the fasted state- not having eaten for 10-12 hours

#2) Each student normal fasting glucose level will be determined using the test strips for the glucometer assigned to each student. Each volunteer will clean a finger with 70% alcohol, then use a sterile lancet to obtain a drop of blood for the test.

#3) Each student will then drink a lemon-flavored solution of 25% glucose. The quantity of solution will be based on 1 g of glucose per kilogram of body weight. To determine body in kilograms, the weight in pounds will be divided by 2.2.

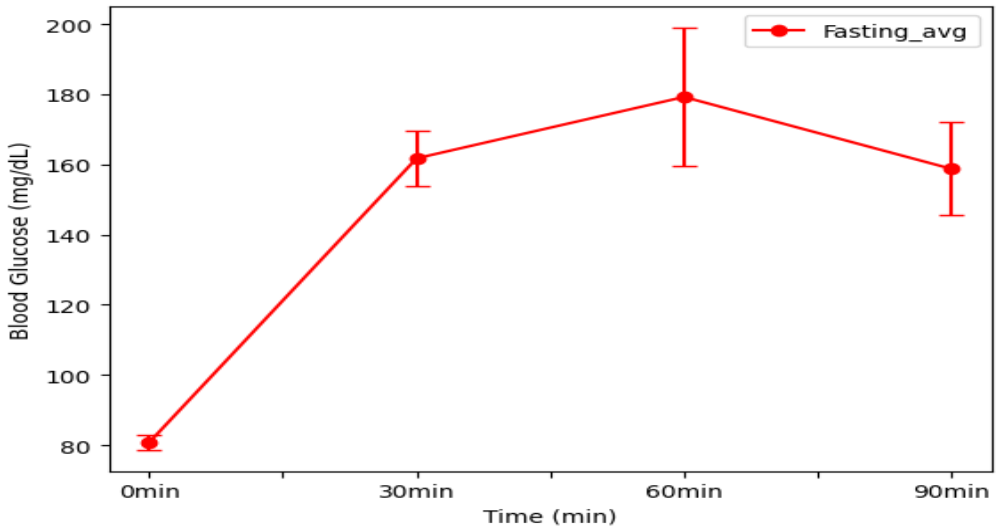
#4) After ingesting the glucose, the subject will repeat the blood testing procedure every 30 minutes. Testing will continue in this manner for 1 ½ hours or until the end of the lab period.

#5) Record and graph the average of the class results of the blood glucose tests.

#6) Compare the results with the normal glucose tolerance test curve. Describe the graphs in terms of absorption and post absorptive states.

Results:

Groups	1	2	3	4	5	6	7	Fasting VRG	Fasting SEM
0 min	75	77	85	86	103	81	83	80.75	2.101587
30 min	140	159	158	190	141	131	161	161.75	7.845988
60 min	154	135	174	254	171	152	180	179.25	19.773419
90 min	151	141	133	210	170	185	191	158.75	13.210295



Discussion: The results shown here are different from everyone else's. The reason being this is because everyone's body reacts differently. We noticed that in the first thirty minutes of this test we saw that the blood glucose levels started to rise from the ingestion of the solution. After sixty minutes, we see a descent because the body has released insulin from the pancreas to return the blood glucose levels to a normal state. Beta cells are cells that make insulin, a hormone that controls the level of glucose (a type of sugar) in the blood. Beta cells are found in the pancreas within clusters of cells known as islets. In type 1 diabetes, the body's immune system mistakenly destroys the beta cells. Alpha cells (α cells) are endocrine cells that are found in the Islets of Langerhans in the pancreas. Alpha cells secrete the peptide hormone glucagon to increase blood stream glucose levels.

Conclusion: When the hormone binds on the specific target receptor, the enzyme adenyl cyclase in the cell membrane is activated. This helps in the production of cyclic AMP (cAMP). CAMP acts as the secondary messenger. It diffuses through the cell membrane and activates several enzymatic reactions to cause biochemical changes. In the absorptive phase, ingested good is digested and nutrients are absorbed in the bloodstream, whereas in the post absorptive state stored energy reserved is used. So while glucagon keeps blood glucose from dropping to low, insulin is produced to keep blood glucose from rising too high. In the NIDDM, hyperglycemia arises from the loss of normal tissue sensitivity to insulin. If someone has diabetes that isn't treated properly, they have too much sugar in their blood which is hyperglycemia. Too little sugar in the bloodstream (hypoglycemia) is usually a side effect of treatment with blood sugar

lowering medication. The three Ps of diabetes are polydipsia, polyuria, and polyphagia. These mean increases in thirst, urination, and appetite. They are the most common diabetes symptoms and often happen at the same time. Acidosis is a condition in which there is too much acid in the body fluids. It is the opposite of alkalosis (a condition in which there is too much base in the body fluids). Having too much insulin in your blood can lead to having too little glucose. If your blood sugar falls too low, your body no longer has enough fuel to carry out its regular functions. In insulin shock, your body becomes so starved for fuel that it begins to shut down.