

Laboratory 8- Hormonal Activity: The Glucose Tolerance Test

Purpose: The purpose of this lab is to test how glucose will react with the body after fasting for 12 hours. Insulin is an endocrine hormone whose principle function is to assist the transport of glucose across the cellular membrane. When there is a deficiency of insulin, only a small amount of glucose crosses the cell membrane and is used in cellular metabolism. This low rate of transport results in excess accumulation of glucose in the blood, called hyperglycemia. An excess of insulin causes a decrease in the level of blood glucose or hypoglycemia. The glucose tolerance test assays the ability of the body (especially the pancreas) to respond to an excess ingestion of glucose. The changes in blood glucose level following glucose ingestion (1 g/ kg body weight) are markedly different between the normal and the diabetic person.

Procedure: Seven students participated to not have eaten for 12 hours up until after lab. Each volunteered student will clean a finger with 70% alcohol and then use a sterile lancet to obtain a drop of blood for the test. After, each subject will drink a lemon-flavored solution (Tru-Glu) of 25% glucose. The quantity of solution will be based on 1 g of glucose per kilogram of body weight. After ingesting the glucose, the subject will repeat the blood testing procedure every 30 minutes. Record and graph the average of the class results of the blood glucose tests.

Results:

Group	1	2	3	4	5	6	7	Fasting avg	Fasting sem
0 min	75	77	85	86	103	81	83	80.75	2.101586702
30 min	140	159	158	190	141	131	161	161.75	7.845987752
60 min	154	135	174	254	171	152	180	179.25	19.77341891
90 min	151	141	133	210	170	185	191	158.75	13.21029541

Discussion: In this lab, we discussed how the body handles glucose immediately into the body after fasting for 10-12 hours straight. This does have many factors that need to be considered. Depending on the individuals: weight, gender, history of health issues, diabetes, ect., these are all factors depending how the numbers will show. The normal concentration for blood glucose is 90 mg% (90mg/ 100ml of blood), but it may range from 60 mg% to 140 mg%, depending upon the individual's dietary intake of glucose. After ingesting a meal consisting of fats, proteins and carbohydrates, the blood glucose may rise to 130-150 mg%. During fasting, the level falls to around 60-70 mg% in normal individuals. Diabetes mellitus can be caused by a lack of insulin or a hyposensitivity to normal amounts of insulin. When insulin is deficient and the cells cannot metabolize glucose for energy, the cells compensate by increasing their metabolism of fats and proteins. In the glucose tolerance test, a normal healthy individual's blood glucose level rises

from about 90 mg% to around 140 mg% in 1 hour and then falls back to normal within 3 hours or even below normal due to excess insulin release by the pancreas. While a diabetic person shows a hyperglycemic response where the blood glucose levels rise from about 120-160 mg% to as high as 300 mg% and then slowly falls to the fasting diabetic level after 5-6 hours.

Conclusion: In conclusion, in this lab we tested how the body reacts to glucose after fasting for half the day. Between the 7 volunteered students, the recorded data was all pretty similar besides Group 4. Group 4 jumped from 86 at 0 min to 190 at 30 minutes while every other group was averaging at 161.75, the large spike was after an hour and jumped from 190 to 254 while every other group was still under 200 with an average of 179.25. Group 2, 6 and 7 were all groups whose 60 minutes was higher than their 90 minutes. With insulin deficiencies, only a small amount of glucose crosses the cell membrane and is used in cellular metabolism, which is why individuals who can't produce enough insulin (diabetes) must inject insulin to continue their organs to be maintained and work sufficiently or else their body will begin to shut down.