



# CALIFORNIA STATE SCIENCE FAIR 2007 PROJECT SUMMARY

<b>Name(s)</b> <b>Varun Agarwal</b>	<b>Project Number</b> <b>J1101</b>
<b>Project Title</b> <b>Sweet n' Deadly</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> A study of type 2 diabetes, and the effect of high glucose intake on cells.</p> <p><b>Methods/Materials</b> Vacuum aspirator, Propidium Iodide 100mg/mL (fluorescent dye), Centrifuge tubes, 10ml sterile disposable pipettes, Sterile culture plates, Pipette-aid, Pipette tips, Phosphate buffered saline, Culture hood, Incubator, Inverted microscope Liver cells, Culture medium, Glucose, Thick gloves (used to take out cells from liquid nitrogen). I cultured liver cells in a laboratory and tested them with Varying amounts of glucose. I diagnosed two set of cells with 4.5mM (control), 10mM, and 20mM. One set I kept for 24hrs one I kept for 96hrs. At the end of the experiment I compared the results observing the effect of every higher amount of glucose and longer time period. I used an inverted microscope to view the cells in different fields and lights. I drew the percentage of cell death from each group of cells. this experiment can become tedious because to draw a percentage you must count the cells</p> <p><b>Results</b> Percentage of cell death for 4.5mM in 24hrs was 5.7% in 96hrs it was 18.75%. The percentage of cell death for 10mM in 24hours was 12.3% in 96hrs it was 32.4%. The percentage of cell death for 20mM in 24hrs was 16.3% in 96 hours it was 39.1%. This showed that with every increasing value of glucose and longer time period the percentage of cell death was higher. This proved my hypothesis correct.</p> <p><b>Conclusions/Discussion</b> In my conclusion I explained that the cell death was caused by two distresses type two diabetes and oxidative stress. Diabetes type 2 is caused by insulin resistance. Insulin resistance happens when there is a constant intake of glucose. The pancreas produces insulin and puts it in the blood stream so the cells can use the glucose and it is out of the blood stream. When there is higher glucose constantly the insulin has to be dispersed in higher quantities. The cells then become insulin resistance and can no longer take in the glucose so the glucose stays in the bloodstream. This is diabetes. Oxidative stress is when there is an imbalance between the reactive oxygen and the cells ability to repair itself. When there is a lot of glucose oxidative stress is what it results in. The final outcome is the cells dying because they literally are split apart. This is what happened in my experiment.</p>	
<b>Summary Statement</b> My project is about studying diabetes, and along with that doing an experiment which simulates the affect of type 2 diabetes on living cells.	
<b>Help Received</b> I used the type 2 diabetes lab in UC Davis to conduct my experiment. I used the laboratory there to run my experiments and used the equipment supplied there. I used the help of my father to help me design the board.	