



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> <b>Chelsea E. Cameron</b>	<b>Project Number</b> <b>J1406</b>
<b>Project Title</b> <b>Can You Lower the Risk of Nighttime Seizures by Changing the Fat/Protein vs. Carbohydrate Ratio?</b>	
<b>Objectives/Goals</b> Test results intend to show that the Type-1 diabetic can improve the stability of his or her own blood sugar levels during the night by eating high protein dinners that produce more predictable blood sugar levels and lower the risk of developing hypoglycemia during the night.	
<b>Abstract</b> <b>Methods/Materials</b> The method consisted of two separate tests so I could compare the effects of eating a high carbohydrate dinner with a high protein dinner. The first test had Paul eat five, typically eaten high carbohydrate meals (like a typical breakfast), each eaten at 6 p.m., each consisting of 60 grams of carbohydrate and 2 ounces of protein. The other test had Paul eat five high protein dinners, each eaten at 6 p.m., each consisting of 6 ounces of protein and 37 grams of carbohydrate. For both of the five day long tests I gathered data by doing blood sugar testing on Paul using a glucometer during the evening and night and gathered data whenever Paul programmed his insulin pump for extra insulin (called "corrections") if blood sugar levels were above 120 on the glucometer. The glucometer showed the amount of milligrams of glucose per deciliter of blood that were currently in Paul's body at testing times of 6 p.m., 8 p.m., 10 p.m., 12 a.m., and the next morning. Exercise was kept to a minimum. The materials were as follows: human subject, Paul Cameron, age 13, a Type-1 diabetic who wears a 722 Medtronic MiniMed insulin pump. #Novolog# insulin, Medtronic MiniMed BD glucometer and testing strips, batteries, insulin pump site change infusion sets and pump reservoirs, lancet and lancet injector for blood finger pricks, foods listed on Meal Plan #1 and Meal Plan #2, kitchen utensils, appliances, alarm clock, food scale, and carbohydrate gram counting books.	
<b>Results</b> There was a 24% (by measure of Standard Deviation) improvement of the blood sugar stability through the night when comparing a high protein/fat evening dinner (Standard Deviation of 45) versus a high carbohydrate dinner (Standard Deviation of 69). Furthermore, more stable blood sugar levels through the night will reduce the risk of having dangerously low blood sugars that can cause a seizure or unconsciousness, a fear of many diabetics, including Paul.	
<b>Conclusions/Discussion</b> My conclusion is that high protein dinners cause Paul to have more stable blood sugar readings from a glucometer, through the evening and night, than the high carbohydrate dinners.	
<b>Summary Statement</b> This study was done to understand the effects that evening meals (5-days of mostly protein/ fat, plus 5-days mostly of carbohydrates ) have on the stability of blood sugar levels throughout the night for a person with Type-1 diabetes.	
<b>Help Received</b> My mom helped me prepare some of the meals and type some of the report. My dad helped me developed the computer graphs, and taught me how to use ratios, percentages, and understand the use of Standard Deviation for measuring stability of my data.	