



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.) Adam J. Snyder	Science Fair Use Only S1520
Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) Effectiveness of a Continuous Glucose Monitoring System	Division _ Junior (6-8) <u>X</u> Senior (9-12)
Preferred Category (See page 5 for descriptions.) 15 - Physiology	
Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.	
<p>Objective: The purpose of this project is to prove that through the use of a Continuous Glucose Monitoring System (CGMS), a diabetic could detect glucose levels that are outside of a target range (usually 70 # 180 mg/dl), which would be previously untraceable with conventional treatment. CGMS, marketed and produced by MiniMed, is able to measure and record glucose levels for 72 hours averaging them into one value every five minutes. Although CGMS is not yet equipped to display these values on the monitor as they are occurring, it can display them in a graph with the y-axis representing glucose concentration and the x-axis depicting time of day. Conventional treatment consists of taking glucose readings from a blood glucose meter and logging them throughout the day, making any adjustments that are appropriate. Most testing regimens consist of 3 to 6 tests daily, but vary with the individual.</p> <p>Procedure: In this experiment, the CGMS trials were conducted concurrently with conventional treatment and logging. Thus, the same glucose stimuli, such as meals, insulin delivery, and exercise could be reflected in both the CGMS report and conventional treatment logs. All forms of stimuli were noted during the testing period, making for an accurate comparison. After the 72-hour time period passed, comparison between the CGMS report and the conventional logs began. Any instances where the CGMS report noted an out of range glucose level, which was absent in the conventional logs, were highlighted in the CGMS report. This process was repeated two more times for a total of three trials.</p> <p>Results / Analysis: Results showed that there were indeed 19 instances of the CGMS detecting undesirable glucose levels that were not found in the conventional logs. The reason for this success is that the CGMS is able to effectively log glucose levels at all times, day and night. It is impossible to reflect a complete picture of a diabetic's glycemic control through only a few meter readings a day. Conventional treatment, assuming four glucose tests daily, is like trying to predict the course of a jagged line by assessing only four points along the line. CGMS is able to record the whole line as it develops and therefore can provide a complete picture of glycemic control. This experiment has shown CGMS to be a significant step in the search for better control in diabetes management.</p>	
Summary Statement (In one sentence, state what your project is about.) The goal of this project is to effectively show that a Continuous Glucose Monitoring System will significantly allow for better management and control of Type I Diabetes.	
Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. CHOC Hospital supplied me with the Continuous Glucose Monitoring System	