Name(s) Tanner W. Mercer	Project Number **S0413**

Project Title

The Connection between Diabetes and Alzheimer's: Elevated AGEs and Oxidative Stress in the Brain

Abstract

Objectives/Goals
The goal of this study was to test the cognitive function of 70-85-year old women with Type 2 diabetes compared to those without diabetes.

Methods/Materials
I recruited a total of 59 participants, 29 diabetic and 30 non-diabetic, by word-of-mouth and social media. In order to measure each participant's cognitive function, I utilized the Self-Administered Gerocognitive Exam (SAGE), which is an exam that measures overall cognitive function and was designed to screen for Alzheimer's. This test was created by Dr. Douglas Sharre at Ohio State University.

Results
After all of the data was collected, I compared the scores of the two groups using a Student's t-test. From this test, I obtained a p-value of 0.0005, signifying that the non-diabetic had significantly higher scores. Furthermore, I ran another Student's t-test using only the participants who attended college. I did this in order to show that level of education was not a confounding factor in my study. From this test, I arrived at a p-value of 0.014, which still shows a significant difference.

Conclusions/Discussion
My results show that the women with Type 2 diabetes have significantly decreased cognitive function compared to the women without diabetes. This result suggests that Type 2 diabetes can cause decreased cognitive function. My results also support my hypothesis that the women with diabetes have decreased cognitive capabilities due to the elevated levels of AGEs in their bloodstream, which causes a high level of oxidation that can be associated with Alzheimer's.

Summary Statement

I found that the women with Type 2 diabetes had decreased cognitive function compared to the women without diabetes.

Help Received

I designed the experiment, recruited the participants, and completed the project by myself, but Julian Homburger at Stanford helped me decide which statistical test to run on my data.