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2022 PSBR High School Essay Contest *Finalist*

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Alzheimer's is a destructive brain disorder that slowly deteriorates memory and thinking skills, and eventually the ability to carry out life's simplest everyday tasks. Dementia is the loss of cognitive function - thinking, remembering, and reasoning - and behavioral abilities. Alzheimer's is the seventh leading cause of death in America and targets the 65 and older age groups. My great-grandmother was one of 6 million Americans affected. She was diagnosed at the age of 88. One of Alzheimer's' most prominent symptoms is memory loss.

Memory loss and confusion are often common with old age. As a person gets older, their body and brain experience changes. As a result, some may notice that they take longer to learn things, don't remember information as well, and easily lose items. Nevertheless, these changes shouldn't interfere with one's everyday abilities.

My great - grandmother was a storyteller. She came from a family of eight children and had grandparents who came from different countries. She loved sharing the stories that had been passed down to her with all of her grandchildren. Everytime we visited, she told us these stories. She never missed any details and always told them the same way. As she got older, she started to become more forgetful. It was normal, or so we thought.

As time went on, she began to become confused with her stories. This was the first time we realized something was wrong. It wasn't her only symptom, but it was definitely an indicator. Her behavior began to change. She became easily irritable, repeated things, called family members the wrong names, and refused to complete certain tasks. It was beginning to affect her everyday life. After noticing such great changes, we knew she needed to be examined. After this, she was diagnosed.

Diagnosis is essential in treating Alzheimer's and dementia. These fatal disorders both worsen over time. The quicker a person is diagnosed, the quicker they can be treated. These disorders target the brain and damage the central nervous system. Abnormal amounts of proteins buildup in the brain and form amyloid plaques.

These plaques collect between neurons and derange the cell's functions. This causes healthy neurons to stop functioning and lose connection with other neurons in the entorhinal cortex and hippocampus. Both the entorhinal cortex and hippocampus are essential parts of the brain for forming memories. Alzheimer's later affects the cerebral cortex, which is responsible for language and social behavior. As damage continues to spread, other areas of the brain are affected. These changes in the brain are responsible for the dreadful symptoms that interfere with everyday life.

It is important for scientists to be able to study these disorders and their effects on the brain, body, and personality of an individual indicating these symptoms. There are many ways

that these symptoms and changes are studied. One of these is by using animal testing. Mice are used to study Alzheimer's and its effects on the brain. Mice with Alzheimer's - like abnormalities are used because of their similarities to the medial and temporal lobes in humans. They are used to identify molecules such as miR-34c that play a role in the disease's development. Research on these mice allowed scientists to develop chemicals known as radiopharmaceuticals. These were developed to emit radiation in the presence of beta amyloid (found by functional brain scans).

This radiation significantly reduces the beta amyloid plaque. This allows the patients to hold on to their cognitive function and carry out their everyday lives for as long as possible. This trial, first established in mice, has been successfully trialed in humans. Alzheimer's is not curable, however the testing done on animals is essential to understanding treatment options and the care needed for diagnosed patients. With these studies, information is found and used for the benefit of those diagnosed.

Ultimately, biomedical research has benefitted mine, as well as other families with members diagnosed with Alzheimer's and dementia. Alzheimer's is known as a progressive disease that worsens with time. Without a known cure, it can be stressful for families knowing a loved one is suffering under these circumstances. It helps alleviate stress and worry knowing that scientists are committed to researching and finding treatments. Without the testing on mice, scientists wouldn't have the information that's used to provide appropriate care for patients. I am thankful for this biomedical research, as it enabled my grandmother to live out her last moments of life as comfortably as possible.

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