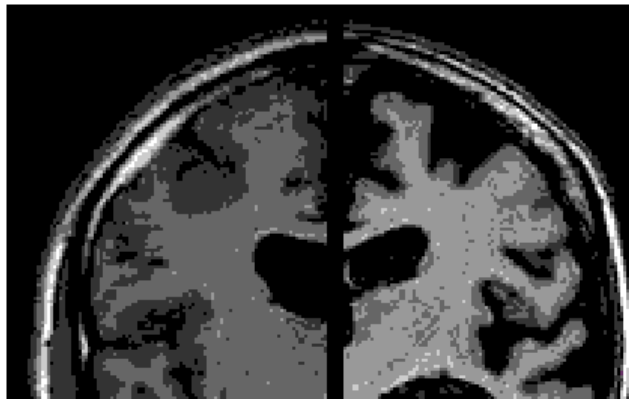


Alzheimer's Disease

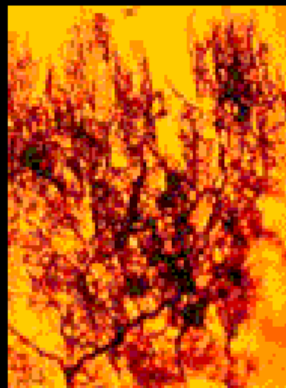
PCH Wellness 201-07

Sarah Pinheiro

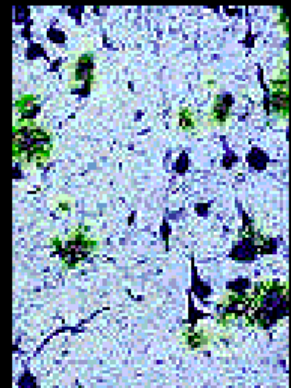


CAT scan of normal brain

CAT scan of brain of a patient with Alzheimer's disease



Neurofibrillary Tangle in the brain of a patient with Alzheimer's disease



Amyloid deposits in the brain of a patient with Alzheimer's disease

Alzheimer's Disease

Alzheimer's disease is defined by the Alzheimer's Foundation of America "as a progressive, degenerative disorder that attacks the brain's nerve cells, or neurons, resulting in loss of memory, thinking and language skills, and behavioral changes." This happens when neurotransmitters, called acetylcholine, breaks connections with other nerve cells and ultimately die. Two types of abnormal lesions clog the brains of people with this disease. They are called Beta-amyloid plaques, which form outside and around neurons and tangles, which are twisted fibers made up of the protein tau that build up inside nerve cells. Although these structures are characteristics of the disease, scientists are unsure if they cause it or are a consequence of it.

Introduction

- I chose Alzheimer's disease as my research topic because many people that I know have died of this disease and I am curious to know how exactly it affects a person. So far I have learned that it is a devastating disease for anyone to have. Once it is diagnosed it is downhill from there. My boyfriend, David's grandmother has recently died from this disease and it was sad even for me when she simply did not even remember my name. I am also a psychology major and I know that this is a brain disease that destroys brain cells, causing memory loss and problems with thinking and behavior severe enough to affect all aspects of a person's life. With Psychology as my major I was even more drawn in to learn why this disease affects the brain so severely. From recent health classes, I have also become aware with the fact that it is one of the leading causes of death in the United States.

Section 1: Background and Problem Statement

- **Web site #1 Name: Alzheimer's Foundation of America**
- **Web address: <http://www.alzfdn.org/AboutAlzheimers/definition.html>**
- **Background Information:**
 - Healthy People 2010 does not address Alzheimer's disease but there are several different non-profit organizations found throughout the country that are dedicated to the research of this disease and reach out to those who have it and to their family members. Alzheimer's Foundation of America is an organization that reaches out to those who have been diagnosed with this form of fatal dementia and to their families who need help coping with these unfortunate people. Their mission statement is "to provide optimal care and services to individuals confronting dementia, and to their caregivers and families—through member organizations dedicated to improving quality of life." This organization wants to raise awareness of this disease and believe that by doing so it can help remove the stigma of the disease, lead to early detection (which is memory loss) and proper treatment, and ultimately improve the quality of life. Anyone is free to join the organization and people are encouraged to donate to it to fund the research of this disease.

- **Web site #2 Name: Alzheimer's Association**
- **Web address: <http://www.alz.org/index.asp>**
- **Background Information:**
 - The Alzheimer's Association is the leading voluntary health organization in Alzheimer care, support and research. Their mission is to eliminate Alzheimer's disease through the advancement of research and to reduce the risk of dementia through the promotion of brain health. Their vision is a world without Alzheimer's disease. They have all different numbers for people with questions to call, links to their sponsors, groups, and walks that anyone may attend. A statistic on the page says that every 70 seconds someone will develop Alzheimer's but that this fall a nation will walk to find a cure. They are known for maximizing research and also for their knowledge of the disease. They also work hard to help those who suffer. Unlike the first organization, this one encourages those who are living with Alzheimer's disease to speak out about the issues they face, the impact of the disease on their families and their needs in the communities in which they live. Information about this disease is available for those who are unaware. One piece of information this site shares with caution is that memory loss is not a normal part of aging. People misinterpret this for old age when it is actually the greatest sign of Alzheimer's.

- **Web site #3 Name: The Foundation for the National Institutes of Health**
- **Web address: <http://www.fnih.org/work/areas/chronic-disease/adni>**
- **Background Information:**
 - This Web site facilitates groundbreaking research for all different national institutes of health. One of which is The Alzheimer's Disease Neuro-imaging Initiative, which is conducted by the National Institute on Aging. This organization does extensive research on the brain to obtain information about this disease. Their research has become so effective that pharmaceutical companies developing Alzheimer's disease drugs have begun using The Alzheimer's Disease Neuro-imaging methodologies in their clinical trials. This organization understands that Alzheimer's disease has no cure or lasting, effective treatment but is on a mission to find one. Currently, more than five million people in the United States suffer from it and its occurrence is expected to increase dramatically over the next 20 years.

Section 2: Research

- **Web site #1 Name: Pub Med**
- **Web address: <http://www.nia.nih.gov/Alzheimers/Publications/geneticsfs.htm>**
- **Summary of the research:**
 - It is understood that genetic factors play a crucial role in the risk of developing Alzheimer's disease. While some rare forms of Alzheimer's, called early-onset, occur before the age of 65, the most common case of Alzheimer's, called late-onset, usually begins after the age of 65. The most common gene associated with

late-onset Alzheimer's is called apolipoprotein E (APOE), which has three types. However, APOE e4 is a little more common. It appears to increase the risk of Alzheimer's. Dozens of studies have confirmed that the APOE e4 gene increases the risk of developing this disease, but it is not yet understood how. These studies also have helped explain some of the variation in the age at which Alzheimer's develops, as people who inherit one or two APOE e4 genes tend to develop the disease at an earlier age than those who do not have any of these genes. The Web site classifies APOE e4 as a risk-factor gene because it increases a person's risk of developing Alzheimer's. However, inheriting this gene does not mean that a person will definitely develop the disease. Some people with one or two APOE e4 genes never get the disease, and others who develop it do not have any APOE e4 genes. There is a blood test that can detect what APOE a person has but it cannot detect if the person will or will not have Alzheimer's because APOE e4 is only a risk factor and a blood test cannot detect this.

- **Web site #2 Name: Scirus Search Engine, Eurekalert.Org**
- **Web address: http://www.eurekalert.org/pub_releases/2009-12/si-dta120409.php**
- **Summary of the research:**
 - This Web site is about an interesting study done by researchers at the Salk Institute for Biological Studies. They found that simply slowing the aging process in mice prone to develop Alzheimer's disease prevented their brains from turning into a "neuronal wasteland" (Delaying the aging process protects against Alzheimer's disease). Since aging is the single greatest risk factor for Alzheimer's disease, this group of researchers went to the root of aging and decided to see if by reducing the aging process in mice susceptible to Alzheimer's if it would actually reduce the risk. They went ahead and lowered the activity of the IGF-1 signaling pathway, which plays an immediate role in the lifespan and youthfulness in many species like worms and plays a role in longevity in humans. They went on to find that mice with reduced IGF-1 signaling lived 35% longer than normal mice. Next, they performed many behavior tests to see whether it was the passage of time or aging that impacted the disease. Normal-aging Alzheimer's mice showed severe impairments in their ability to find a submerged platform in the Morris water maze or stay on top of a revolving Rota Rod. One of the characteristic signs of Alzheimer's disease is the buildup of toxic clumps of beta amyloid plaques in the brain. Beta amyloid production occurs in all brains, but healthy cells clear away surplus amounts. Brains of people with Alzheimer's disease, on the other hand, are unable to control this buildup. This is also true for Alzheimer's mouse models, which were genetically engineered to overproduce beta amyloid. "Although before it was thought that plaques are the causative agents of Alzheimer's disease, our results clearly support the emerging theme that they have a protective function," says one of the researchers. "As mice age, they become less efficient at stowing away toxic beta amyloid fibrils in tightly packed aggregates." They later found that long-lived humans carried mutations in components of the IGF-1 signal pathway. They arrived at the conclusion that by exercising and increasing daily exercise could reduce the risk of Alzheimer's.

- **Web site #3 Name: Google Scholar search engine, Neurology**
- **Web address:**
<http://www.neurology.org/cgi/content/full/72/4/e21?maxtoshow=&HITS=20&hits=20&RESULTFORMAT=&searchid=1&FIRSTINDEX=0&displaysectionid=Patient+Pages&resourcetype=HWCIT>
- **Summary of the research:**
 - Plagues and tangles are often found in the brains of people with Alzheimer's. At the same time, some patients with dementia have very few of these brain changes. Brain researchers wonder how it is possible that memory and brain function is healthy in patients even though their brains show problems often seen with Alzheimer patients. In this study researchers compared brains of Alzheimer's patients to another group that had similar findings under the microscope but had normal thinking and memory. They found that plaques and tangles might be necessary to cause Alzheimer's, but that there might be some important reasons why some patients did not get Alzheimer's. They thought that patients with healthy brains might be able to lose some brain function but still be able to function without developing dementia. They found that the groups were different when the sizes of some brain areas were compared. Those people with plaques and tangles who did not show thinking and memory problems had a larger brain size than the group that had dementia. Also, the hippocampus, which is the brain structure that is important for new learning and memory, was also larger in the healthy group. Overall, this study showed that there is not a direct link between the presence of tangles and plaques to dementia which causes Alzheimer's. These results raise the important possibility that for healthy brain aging, healthy brain cells and a high number of brain cell connections, which are called synapses, are required.

Section 3: Statistics

- **Web site #1 Name: National Center for Health Statistics**
- **Web address:** <http://www.cdc.gov/nchs/fastats/alzheimr.htm>
- **Summary of the statistics:**
 - According to the National Center for Health Statistics the number of patients in hospice care with Alzheimer's as a primary diagnosis is 7,900 which means that 7.5% of those in hospice care have Alzheimer's disease. In nursing homes throughout the United States, 231,900 residents are living with Alzheimer's, which is 16% of those who live in nursing homes. The mortality rate is 72,432 and it is the 7th leading cause of death for all ages across the United States in 2006, but the 5th leading cause of death for those aged 65 and older.
- **Web site #2 Name: Alzheimer's Disease Facts and Figures (Alzheimer's Association)**
- **Web address:** http://www.alz.org/documents_custom/report_alzfactsfigures2010.pdf
- **Summary of the statistics:**
 - This report provides a statistical resource for United States data related to Alzheimer's disease, the most common type of dementia. It is reported that 5.3

million people have Alzheimer's disease. Also, there is an annual cost of 172 billion dollars. More women than men have dementia, primarily because women tend to live longer. This long life expectancy, therefore, increases the time women can develop this disease. One in eight people aged 65 and older, or 13 percent, have Alzheimer's disease. Also, every 70 seconds, someone in America develops Alzheimer's. It is reported that, by mid-century, someone will develop the disease every 33 seconds. This organization also reports that Alzheimer's disease increased 46.1 percent, while those people with the number one cause of death, heart disease, and decreased 11.1 percent. This means that if a cure is not found that the problem is only going to get worse. Finally, older African Americans and Hispanics are considered more likely than older whites to develop this disease.

- **Web site #3: Alzheimer's Foundation of Aging in America**
- **Web address: <http://www.alzfdn.org/AboutAlzheimers/statistics.html>**

Summary of the statistics:

- Although Alzheimer's disease is not a normal part of aging, the risk of developing the illness rises with age. Current research from the National Institute on Aging indicates that the frequency of Alzheimer's disease doubles every five years beyond age 65. Also, this organization reports that one to four family members act as caregivers for each individual with Alzheimer's disease. This disease is increasing demand as time goes on and people get older. However, It is estimated that about a half million Americans younger than age 65 have some form of dementia, including early onset Alzheimer's disease. Early Onset simply means that Alzheimer's is seen earlier in life.

Section 4: Consumer Information

- **Web site #1 Name: Medicine Plus**
- **Web address: <http://www.nlm.nih.gov/medlineplus/alzheimersdisease.html>**
- **Summary of the information:**

- In order to understand what Alzheimer's is a person must be familiar with what causes this disease. According to Medicine Plus, Alzheimer's is a type of dementia, which is a brain disorder. It begins slowly so it is hard to detect at first. Some people think that being forgetful is a sign of aging but this is a misconception. There are numerous elderly people who have the memory of a teenager. People with Alzheimer's may have trouble remembering things that happened recently or names of people they know. Over time, symptoms get worse. People may not recognize family members or have trouble speaking, reading or writing. They may forget how to brush their teeth and begin to misplace things. As the disease worsens, they may become restless or hostile, and begin wandering away from home. Eventually, they need total care. This can cause great stress for family members who must take time out of their lives to care for them since they need 24-hour care. This disease usually begins around age 60 and the risk to develop it increases with age. Your risk of this disease is higher if a family member has it. As of right now, there is no treatment that can

stop the disease but some drugs help limit its progress for a limited amount of time.

- **Web site #2 Name: FDA**
- **Web address: <http://www.fda.gov/NewsEvents/Testimony/ucm110879.htm>**
- **Summary of the information:**
 - A person with Alzheimer's disease should be aware of the medications available to them, what ones work, and what ones do not, and also which are approved by the FDA. There currently are five drugs approved for the treatment of Alzheimer's disease: Cognex, Exelon, Razadyne, Aricept, and Namenda. Each of these drugs work in their own ways depending on how severe the case of Alzheimer's is. For example, all except Namenda are approved for the treatment of mild to moderate Alzheimer's disease. There is also a drug called Exelon that is made in a patch form for those who dislike taking medications orally. This drug also reduces gastrointestinal side effects compared to the oral form. All of these drugs except Namenda act by increasing brain levels of acetylcholine, a neurotransmitter that is low in patients with Alzheimer's disease. Namenda is approved for the treatment of moderate to severe Alzheimer's disease only and should not be used for the onset of Alzheimer's. Of all the medications, Aricept is the only one used to treat all degrees of severity of the disease. However, these approved drugs have never shown to do anything other than treat the symptoms of Alzheimer's disease.

- **Web site #3 Name: Help Guide**
- **Web address: http://helpguide.org/elder/alzheimers_disease_symptoms_stages.htm**
- **Summary of the information:**
 - Sometimes diseases are overlooked mainly because people or even caregivers overlook warning signs. Help guide.org is a trusted non-profit organization whose mission is to educate people on diagnosis of diseases. The top ten warning signs of Alzheimer's are: memory loss, difficulty performing everyday tasks, sudden problems with language, disorientation of time and place, poor or decreased judgment (dressing inappropriately in more noticeable ways), problems with abstract thinking (not recognizing numbers), misplacing things (like putting an iron in the freezer), changes in mood or behavior (more rapid mood swings), changes in personality, and loss of initiative (loss of interest in hobbies). It is recommended to seek expert advice if a person feels they may have this disease especially because Alzheimer's disease causes more worry than any other condition for Americans over 55 years of age. There is no single test for Alzheimer's disease but a general practitioner, neurologist, or geriatrician can make a reasonable diagnosis from the symptoms a person may be having.

Section 5: Solutions to the Problem (or Issue)

- **Web site #1 Name: The National Institute on Aging**
- **Web address: <http://www.nia.nih.gov/Alzheimers/Publications/homesafety.htm>**
- **Summary of the information:**

- This non-profit organization is responsible for the leading research on aging. Funding is very important to this organization in order for them to expand their research. They offer many booklets and information that a consumer can obtain by mail, by calling, or simply by reading information displayed on their site. One booklet they offer is based on how to live with a person with this disease and if it is okay to leave them home alone. They have found that it is a safety concern to leave someone alone at home with Alzheimer's. However, it depends on the severity of the disease. Often if the person has early onset Alzheimer's it is okay to some extent but it is recommended to contact health care professionals for advice. This Web site also offers a checklist to caregivers on potential risks in the home. There are links to Web sites that sell gadgets to safety proof ones home. This site also gives tips on all parts of the house such as the entrance way, which recommends having a ramp so that the person with the disease does not fall. They recommend that a safe home can be a less stressful home for the person with Alzheimer's, the caregiver, and family members. It is very hard to live, or even take care of a person with this disease.
- **Web site #2 Name: The Alzheimer's Research Center**
- **Web address: http://alzheimer.wustl.edu/About_Us/Donate.htm Summary of the information:**
 - The Alzheimer's disease Research Center at Washington University is funded by grants from the National Institute on Aging. Since they are research-based they depend on private donations for their Postdoctoral Research Fellowship Program, which provides new MDs and PhDs with opportunities to work with for one to three years on special research projects. This organization also uses funding to support community research events, help families in need of support, and also to educate those who do not know much about the disease. Their site contains many other organizations that they also encourage people to donate to. They stress the fact that without funding, a cure is impossible to reach. They offer a section on treatment facilities for victims of this disease and therapy groups for family members.
- **Web site #3 Name: Alzheimer's Association**
- **Web address: http://www.alz.org/alzheimers_disease_treatments.asp**
- **Summary of the information:**
 - The Alzheimer's Association is another non-profit organization that longs to eliminate Alzheimer's disease through the advancement of research. They give a lot of information on their back ground and how they got started. They also run by funding and ask anyone to donate in order for them to keep researching and helping those in need. They claim to have helped millions of lives. One of the tabs of information they offer is about treatment which serves a great purpose to those with the disease who do not know what to do, or those who suspect that they may have it. One interesting thing scientists found was that vitamin E may help because it is an antioxidant and it has slightly delayed loss of ability to carry out daily activities in residential care. Many doctors have been using it but the Web site urges patients not to use it without talking to a doctor because it could react

with other medications or even cause blood clots. It also talks about how people with this disease have trouble sleeping since their sense of time and place is off. The Web site offers tips of what patients should do. There are numerous tests that can determine why this happens. For example, it could be sleep apnea and have nothing to do with the Alzheimer's. It is recommended not to take medications if it is directly related to the disease because it could negatively react with the drugs the person is already taking. This Web site offers many other tips and treatment opportunities for those with Alzheimer's.

Conclusions:

After extensively researching on the dreadful disease of Alzheimer's I feel that I have gained a lot of valuable information. It is a shame that there is still no available cure for it since it develops in about five percent of people between the ages of 65 and 74 and nearly half the people over the age of 85, with the total of 5.3 million people. The only recommendation doctors, researchers, and experts on the disease have is to maintain a healthy lifestyle and keep your brain active. I also learned that there are factors that contribute to the disease such as, age, heredity, education levels, lifestyle, and gender. I was shocked to find out that women more frequently develop this disease but then I realized that it is because women live longer than men and that Alzheimer's is more common with older age. This disease is only getting worse but hopefully with the help of non-profit organizations, researchers, and doctors a cure can soon be found.

Pictures on cover:

<http://www.bioscience.org/images/alzheim2.gif>

<http://mydailycolumn.files.wordpress.com/2009/07/graphics-alzheimers.jpg>

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