

SCIENCE FAIR LOGBOOK

Name: Unaisa

AGENDA :

- Topic
- Research Question
- Background Information
- Source of Information
- Variables
- Stages of Alzheimer's
- Symptoms
- Hypothesis
- Report
- Brain affected by Alzheimer's

- Result chart
- Result analyze
- Result chart
- Conclusion
- Applications
- Source of error
- Extensions



TOPIC:

Write about the topic you chose. Why did you choose this topic? What do you hope to find out?

My topic is Alzheimer's disease {AD} and the reason for selecting this topic is because I am emotionally connected towards my grandfather who passed away 7 years ago due to Alzheimer's disease. I took this as an opportunity to research and understand more about Alzheimer's and ways to detect / prevent it.

What is Alzheimer's disease ?

Alzheimer's is a neurodegenerative disease due to its thinking abilities decline as well as their memory fades . Alzheimer's is not normally a part of aging , and the worse part is it's irreversible.

RESEARCH QUESTION

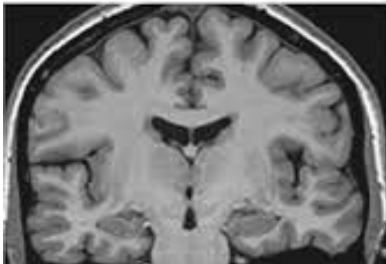
How does _____ affect _____?

What is the effect of _____ on _____?

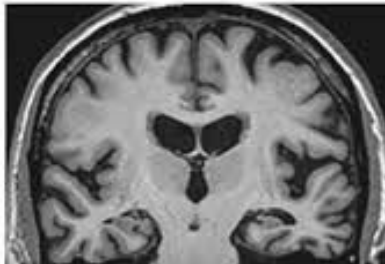
Which _____ is/does/makes/etc _____?

How does Alzheimer's disease affect your brain?

Healthy Control



Alzheimer's Disease



<https://www.brightfocus.org/resource/how-does-alzheimers-disease-affect-the-brain/>

BACKGROUND INFORMATION

Research your topic and write about what you find out IN YOUR OWN WORDS. Add slides as necessary. Make sure to note your sources of information on the Sources page.



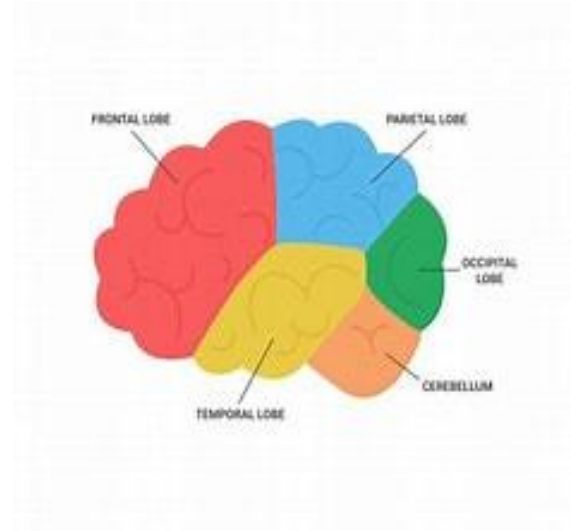
Alzheimer's disease is named after Dr. Alois Alzheimer. In 1906 a patient called Auguste Deter went to Dr. Alzheimer he noticed changes in the brain tissue of Auguste Deter later she died because of an unusual mental illness. She had severe memory loss, unpredictable behavior, she had problems speaking. After her death, he examined her brain and found many abnormal clumps and tangled bundles of fibers.

Soon he showed what he found to the doctors and he got named after the disease as an honor of finding it .

BACKGROUND INFORMATION : FRONTAL LOBE

The frontal lobe helps with :

- Planing
- Problem solving
- Motivation
- Judgement
- Social behavior
- Reward
- Learning



If Alzheimer's / beta amyloid plaques forms in the frontal lobe area that might impact our social behavior, learning , judgement abilities, problem solving abilities.

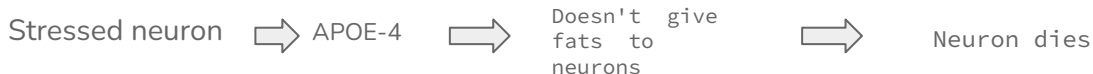
BACKGROUND INFORMATION

Research your topic and write about what you find out IN YOUR OWN WORDS. Add slides as necessary. Make sure to note your sources of information on the Sources page.

What triggers Alzheimer's?

The causes of Alzheimer's include the following:

- Age-related changes in the brain (Data: In 2022, nearly 10.7% of Americans aged 65 and over (approximately 6.5 million) were living with Alzheimer's) - cfah.org [Alzheimer's Disease Statistics & Facts \(2023 Update\)](#)
- Genetic Factors - Parent/ Siblings with AD and APOE-e4 gene variant increases the risk
- Lifestyle and Environmental Factors - Cardiovascular Health, Smoking, Alcohol, Poor Diet, Lack of exercise, Sleep problems, Lack of Mental and Social Engagement, Chronic stress, Inflammation
- Brain changes and Protein build up - Amyloid Plaques and Tau plays an important role
Amyloid Plaques: Clumps of beta-amyloid protein that accumulate between nerve cells, disrupting communication.



BACKGROUND INFORMATION

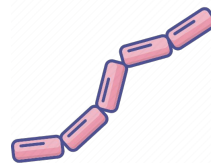
What questions/information do you need to find out about your topic? What is some important vocabulary?

5 Whys to know how Tau impacts Alzheimer's?

- What is Tau and how it impacts AD? Tau is a protein that gives shape to neurons. In AD, Tau form tangles
- Why tau tangles form? Because tau proteins become hyperphosphorylated
- Why tau becomes Hyperphosphorylated? Because the balance of phosphate and diphosphate disrupt
- Why the balance disrupt? Because kinases (like GSK-3 β and CDK5) are overactive, and phosphatase activity (like PP2A) is reduced.
- Why are kinases overactive and phosphatase activity reduced? Because of genetic factors, oxidative stress, inflammation



Tau



BACKGROUND INFORMATION

What questions/information do you need to find out about your topic? What is some important vocabulary?

Some major vocabulary words :

- Atrophy - The shrinkage of the brain is called atrophy .
- Plaques - The clumps of beta amyloid between the synapses are called plaques .
- APP- A protein that is present in everyone's brain .
- Beta amyloid -The wrong cut part of APP
- Tau - A protein that binds the neurons to make them stay in shape .
- Neuron - A cell body present in the brain
- The 5'A - the 5'A are the 5 main problems that happen during Alzheimer's Agnosia,Anomia,Aphasia,Apraxia and Amnesia.
- Tau tangled - When tau is clumped up in the wrong way it becomes tau tangled

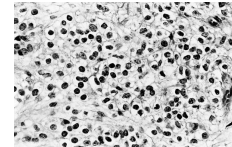
BACKGROUND INFORMATION

What questions/information do you need to find out about your topic? What is some important vocabulary?

5 whys to know how amyloid plaques impact alzheimer's ?

- Why do beta amyloid plaques form ? This happens when APP clumps together in the brain due to imbalance .
- Why do plaques impact the brain ? They block the synapse so the neuron could not function properly .
- Why does the destruction of neurons cause Alzheimer's ? As neurons die the brain has problem to function properly and can't let the information pass through the synapses .
- Why are formation of plaques related to Alzheimer's ? The formation of plaques is a hallmark of knowing a person might have Alzheimer's .
- Why do plaques continue to form in the brain ? Due to the mechanism that clears the plaques fails so they keep developing .

Beta amyloid



SOURCES OF INFORMATION

Note all sources used – websites, books, experts, etc. (*Google is not a website, follow links to find the page information.) Add slides as needed.

Title	Author	Information (web link, publisher, etc)	Year
National Institute on Aging		Alzheimer's Disease Fact Sheet National Institute on Aging	
Alzheimer's Society of Canada		What is Alzheimer's disease? Alzheimer Society of Canada	
Mayo clinic		Alzheimer's disease - Symptoms and causes - Mayo Clinic	
Drbeen medical lecture		Colorectal Cancer Study with This Amazing Drug	
Alzheimer's association		Alzheimer's & Dementia Help Canada Alzheimer's Association	

SOURCES OF INFORMATION

Note all sources used – websites, books, experts, etc. (*Google is not a website, follow links to find the page information.) Add slides as needed.

Title	Author	Information (web link, publisher, etc)	Year
Dementia society		what is alzheimers - Dementia Society	
Seeking alpha		Alzheimer's Disease: 40 Years In The Wilderness Seeking Alpha	
Wikipedia		Alois Alzheimer - Wikipedia	
U.S News		Preventing Dementia and Alzheimer's: 8 Habits to Reduce Your Risk U.S. News	
CFAH		Alzheimer's Disease Statistics & Facts (2023 Update)	
Alzheimer's		Alzheimer's disease - NHS	

VARIABLES

Manipulated / Independent Variable

ONE thing that you will test/change:

Factors that causes AD

Responding / Dependent Variable

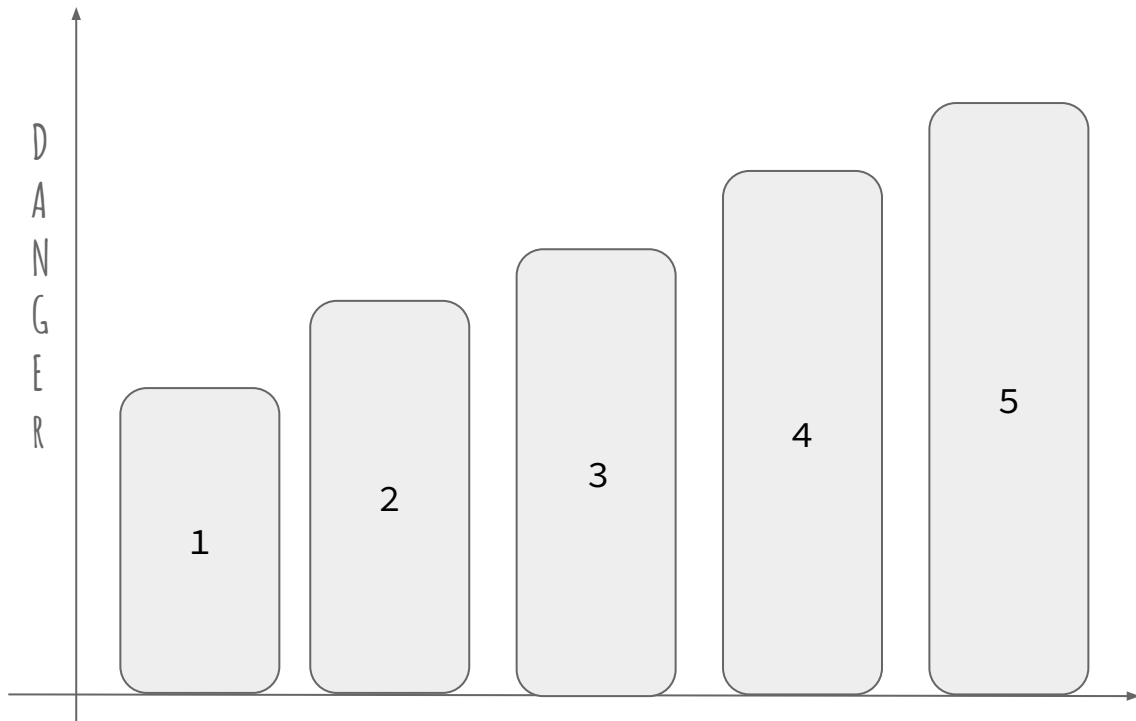
The thing I think will change or be affected:

Type of symptoms and their severity

How will you measure it? :

Data results in medical research

STAGES OF ALZHEIMER'S



-
1. Preclinical Alzheimer's
2. Mild cognitive
3. Mild alzheimer's
4. Moderate alzheimer's
5. Severe alzheimer's
-

SYMPTOMS

- ❖ Thinking clearly
- ❖ Getting lost
- ❖ Confusion about day, date, time, year and month
- ❖ Repeating same thing
- ❖ Language problems
- ❖ Mood changes and personality changes
- ❖ Weight loss
- ❖ Interest in eating
- ❖ Misplace items
- ❖ Problem to express
- ❖ Extreme memory loss

- ❖ Problem solving
- ❖ planning
- ❖ problem in communicating
- ❖ can't learn
- ❖ problem reading and writing
- ❖ can't understand images
- ❖ forget people
- ❖ seizure
- ❖ delusion
- ❖ Problem doing daily activities

HYPOTHESIS

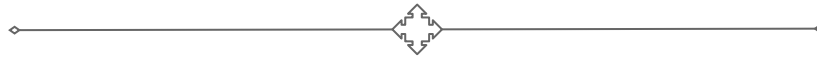
Your prediction, or what you think will happen:

If _____ then _____ because _____.
(I do/change this...) (I think this will happen) (Why?)

*use info from your research or background knowledge to help explain)

Based on the root cause identified I predict that the way alzheimer's affects someone are the following :

Shrinkage of the brain , decline memory , neuron death , an unhealthy diet , lack of communication , due to some family genes and environmental factors.



REPORT

As the report i will write all the answers of the question in the quiz.

It might be possible to stop alzheimer's if the person who has alzheimer's would sleep enough , eat enough , try new thing .

Could they ? Plan everything, communicate normally, forget familiar people eg: friends family , express themselves, forget what we were up to, try new things, get lost in well known places,

Do they ? hesitate to try new things, act like people we are not, remember everything

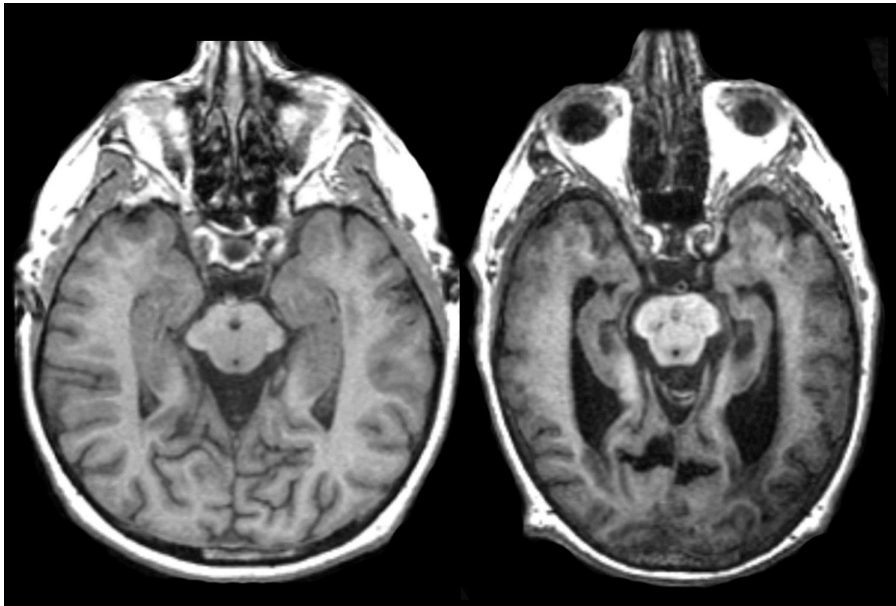
PROCEDURE

List the step-by-step procedure you will follow to conduct your experiment. Be as specific as possible and include exact measurements, quantities, times, etc.

Background research - General all about alzheimer's . Find all the 5'A and 5 why . with the question what formed plaques and tangles .
Question - How does Alzheimer's affect the brain ?
Variables - the manipulated variable , responding variable and controlled variable .
Hypothesis - A infer about what symptoms are caused in what part of the brain due to what reason .
Result - Factor's table
Report - The report of all doctors and the symptoms .
Conclusions - The answer to my question .

BRAIN AFFECTED BY ALZHEIMER'S

Photo :



The grey matter decreases and the ventricles increase in Alzheimer's. The grey matter are the neuron body which is also responsible for a bit of hearing, seeing and hearing. This picture is from [1,520 Alzheimer's](#)
[Headlines: Understanding how chemical changes in the brain affect Alzheimer's disease](#)

RESULTS: CHART

Put your data together into a chart.

Example: (you can change the chart)

Factors	Preventions
Inflammation	Anti inflammatory rich diet { fruits, vegetables, whole grains, lean proteins }
Chronic stress	Sleep and meditation
Lifestyle factors	Balanced diet, no smoking/alcohol
Sleep	Good quality sleep
Cardiovascular Health	exercise
Social and mental health	puzzles , reading,new skill social activities

RESULTS: ANALYZE

Look at your data. Look for patterns and trends. Explain what you found out. Are there any patterns or connections? (ex. High in one of your factors and a high occurrence of Alzheimer's?):

I firmly believe that there is lack of awareness on this topic. No cure and the way Alzheimer's is progressing we need to provide more information on this topic in schools. Also the prevention primarily lies in lifestyle habits that are hard to modify later in late ages. Thus I would want this information to be shared across schools. I think this because even the people I interact with don't have any information about Alzheimer's.

CONCLUSION

My question was:

How does alzheimer's affect brain ?

The answer to my question is: Alzheimer's disease affects a person's brain in many ways it kills neurons, the brain shrinks due to Alzheimer's , formation of plaques and tangles,it fades their memory and declines their thinking abilities etc.



My hypothesis was correct because: My hypothesis was right because due to Alzheimer's the brain shrinks , neurons die , memory decline etc .

OR

My hypothesis was incorrect because:

APPLICATIONS

In what ways are your findings useful?

Who could benefit from your results and how?

If we could change these things in our daily life we might be able to stop Alzheimer's disease by reducing inflammation, by managing chronic stress, improving our lifestyle factors, by prioritizing good quality sleep, by paying attention to our cardiovascular health, working on our social and mental health would also help. Anyone who would be under 60 before the age of 60 because people after 60 have some changes to develop Alzheimer's disease aging couldn't be stopped but these lifestyle doctors could. This might be helpful for them in knowing what to do and what they could improve on to prevent Alzheimer's disease. This may also be helpful for families who have their loved one suffer from Alzheimer's they could look into this and could improve these lifestyle factors which would help them.

CONGRATULATIONS!!

You have completed your experiment!

Make sure that you enter information from this logbook into the CYSF Digital platform.

You are now ready to create your trifold display and practice your presentation.

