

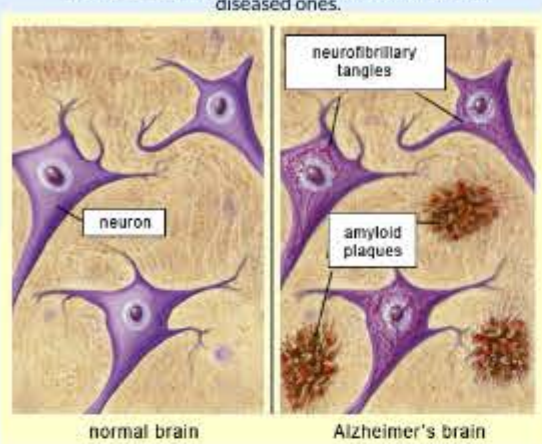


"Alzheimer's disease is an irreversible, progressive brain disorder that slowly destroys memory and thinking skills and, eventually, the ability to carry out the simplest tasks" (NHI).

Alzheimer's occurs when an excess of **tau** and **beta-amyloid** form (NHI).

Tau is a protein in the brain and it works to stabilize the internal skeleton of neurons (Alzheimer's Association).

Figure 1- The comparison of healthy neurons and diseased ones.



Beta-amyloid is a piece of protein that comes from a larger protein called amyloid precursor protein (Alzheimer's Association).

Symptoms

(Alzheimer's Association)

- Memory loss
- Challenges in planning or solving problems
- Confusion
- Poor judgement
- Changes in mood or personality

When tau proteins tangle with each other in the neuron, then signs of Alzheimer's, such as memory loss, may slowly form. This can be seen in figure 1, that compares healthy neurons to Alzheimer's neurons, where it is labeled "neurofibrillary tangles."

When beta amyloid forms in excess in the neurons, then it disrupts the cells' ability to communicate with each other. They, in turn, die off without said communication, causing Alzheimer's. Figure one displays the amyloid plaques.



Important Definitions (Gazzaniga, 250-251)

- **Memory:** "The nervous system's capacity to retain and retrieve skills and knowledge"
- **Encoding:** "The processing of information so that it can be stored"
- **Storage:** "The retention of encoded representations"
- **Consolidation:** "The neural process by which encoded information becomes stored in memory"
- **Retrieval:** "The act of recalling or remembering stored information when it is needed"

Short term memory is defined as, "a memory storage system that briefly holds a limited amount of information in awareness" (Gazzaniga, 258)

Long term memory is defined as, "the relatively permanent storage of information" (Gazzaniga, 260).

While there is not a specific gene that codes for Alzheimer's disease, there are alleles that make it more likely to form.



Tau Protein



Beta-Amyloid Protein



Memory



Short Term Memory



Long Term Memory



Genetics Behind Alzheimer's

When we form a memory, we first encode the information we are experiencing. Then we store it in our brain using consolidation. When we try to remember a memory, we have to use retrieval. With Alzheimer's the brain can not properly perform these procedures because the neurons cannot communicate and they die.

Short term memory is often the first type of memory to be affected by Alzheimer's. Short term memory is stored in the hippocampus, before it is turned into long term memory and stored in the cortex. When the neurons in the hippocampus die, the short term memories have not yet been stored as long term making them easy to forget (Alzheimer's Society).

Long term memory is the last to be forgotten by an individual with Alzheimer's because it has had the longest amount of time to become firmly established in the cerebral cortex. Long term memories also use the hippocampus less in retrieval (Alzheimer's Society).

When offspring inherit the APOE 4 gene then one is more likely to develop Alzheimer's disease. If the offspring develops the APOE 4 allele from both parents then it is even more likely to develop Alzheimer's (NIH).

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Artifact on Memory; Alzheimer's Disease

For this artifact, I made an infographic on Alzheimer's Disease and its effects on memory. I first explain how Alzheimer's forms and its symptoms. I chose Alzheimer's because I knew I could be able to connect the disease to chapter seven in our textbook.

Before explaining how Alzheimer's affects different types of memory from the textbook, I first explained how we form memories in general. I explain that encoding is "the processing of information so that it can be stored," that storage is "The retention of encoded representations," that consolidation is "the neural process by which encoded information becomes stored in memory," and that retrieval is "the act of recalling or remembering stored information when it is needed" (Gazzaniga 251). After explaining how these processes allow us to form memories, I then define short term memory as, "a memory storage system that briefly holds a limited amount of information in awareness" (Gazzaniga, 258) and long term memory as, "the relatively permanent storage of information" (Gazzaniga, 260). I talk about how Alzheimer's affects these types of memories and the rate at which they are affected.

I then go on to discuss the genetic variables of Alzheimer's because I want to be a geneticist. When I become a geneticist, I could find myself working with individuals who are concerned with their chances of developing Alzheimer's disease. I would analyze their DNA and look for genetic mutations that lead to Alzheimer's, or I would look for the APOE 4 allele because it increases the likelihood of developing Alzheimer's.

Between researching, infographic development, this explanation, and the references page this artifact took be around four hours and fifteen minutes.

References

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