## Genetics Writing Assignment #5- Kathryn Kuder

The article that I found was about a rare genetic mutation that counteracts the effects of Alzheimer's disease in those who carried both the mutation and the disease. According to the article, people who have the APOE4 gene are more likely to have Alzheimer's disease as well as an early death. In fact, 40% to 60% of people who are diagnosed with Alzheimers carry the gene. However, carriers of this mutation have an increased amount of the protein humanin, which is found in increased levels in people who have lived past 100 years old. This gene is known as P3S-humanin and it is extremely rare, mainly being found in Ashkenazi Jewish people.

This article relates to genetics because many genes work in the cell to code for various proteins. These genes code for sequences of amino acids, which are the building blocks of proteins. When a sequence of genes that codes for a protein is transcribed and translated into a chain of amino acids, that chain is later able to become a protein that serves a certain function in the body. One of these proteins, for example, is the protein humanin.

According to the article, the protein humanin is produced by the cell's mitochondria and helps against stress and cellular aging. The protein also helps the brain function by reducing inflammation and stress, as well as protecting against Type 2 Diabetes by improving metabolism of blood sugar and helping insulin resistance. Among those with the APOE4 gene, the article states that those who also had the P3S-humanin gene outperformed those who did not in cognitive tests. This may be because humanin protein from this gene is able to bind more effectively to the APOE4 protein product which helps to clear away amyloid-beta that builds up in the brain and is linked to severe Alzheimer's symptoms.

The scientific article that I found was able to back up this information, such as how the APOE4 gene influences the longevity of humans. The article discusses how the P3S gene helps to resist the effects of Alzheimer's caused by the APOE4 gene by describing an experiment observing the buildup of amyloid-beta in the brains of lab mice. Additionally, the study showed that the P3S variant of the humanin protein was more likely to strongly bind to the APOE4 gene than the wild-type variant of the humanin protein.

- Miller, B. et. al. Humanin variant P3S is associated with longevity in *APOE4* carriers and resists *APOE4*-induced brain pathology. Aging Cell; https://doi.org/10.1111/acel.14153.
- Thompson, D. (2024, March 29). Mutation helps even carriers of "alzheimer's gene" avoid alzheimer's. US News.org. https://www.usnews.com/news/health-news/articles/2024-03-29/mutation-helps-even-carri ers-of-alzheimers-gene-avoid-alzheimers