

Increased Alzheimer's Risk in Women due to Certain Genes Related to Menopause and Heat

Young Lee

12th grade, Huron High School, Ann Arbor, MI, USA

Introduction

Alzheimer's disease is the 6th leading cause of death in America, which cannot be slowed, stopped, or even cured. It begins in the entorhinal cortex and then spreads in the brain, causing neural cell death along the way. This leaves the afflicted in stages of gradual, increasing impairment such as memory loss and immobility. Out of the people living with Alzheimer's nearly 2/3 are women. When such a significant portion of those living with the disease share a trait, it's important to understand why this occurs. Recent research has tried hormone treatment related to estrogen; however, there is still a lot unknown. It remains a multifaceted problem that requires examination of other related genes.

Methods

Using a microarray dataset from GEO omnibus, the gene list from the control vs. incipient case was extracted using Cygwin. From there, the list was analyzed for significance and relation using String.

Results

A list of more than 20 genes was inputted into String, showing many interconnections and central hubs. From these results, it was displayed that ESR2 was related to APOE, a common hallmark gene of Alzheimer's that puts those who have it, at risk for early onset. ESR2 is a gene responsible for estrogen reception that deteriorates due to age. However, also related were the genes HSP90B1, and HSP90AA1. These two genes are restricted to the endoplasmic reticulum and deal with heat shock proteins (HSPs). HSPs allow proteins to be able form into the right shape under varying temperatures, and are essential for the body to be able to function well. Malformed proteins are not able to perform the tasks they were designed for.

Conclusion

HSPs may also be responsible for the cause of Alzheimer's and need further research. They are a vital part of a person's wellbeing and need to function well. Too many questions remain to explain the difference between Alzheimer's occurrence in males and females that need answers.

References:

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2. Vina, J., & Lloret, A. (n.d.). Why women have more Alzheimer's disease than men: gender and mitochondrial toxicity of amyloid-beta peptide. *National Center for Biotechnology Information*. Retrieved June 6, 2014, from <http://www.ncbi.nlm.nih.gov/pubmed/20442496>



I just graduated from Huron High School and will attend the University of Michigan, potentially studying Biochemistry. Before then I attended, Thurston Elementary and Clague Middle School. While in high school, I participated in cross country, track, band, and Tae Kwon Do as well as other clubs and organizations. I also enjoy spending time with people the best. It's interesting to hear everyone's individual story. I've been a part of miRcore since my freshman year and am very impressed at how far we've come. It's been a mind-opening experience that will serve me through the rest of my life. I want to give special thanks to Dr. Inhan Lee for giving up so much of her time even though she is a very busy person. By the way, please donate to our fundraiser!