Exploring the Relation Between Alzheimer’s Disease and Gender

Hypothesis

Gender does not play a major role in AD risk.

Aim

My project investigates whether gender has any significant effect on the likelihood of developing Alzheimer’s disease (AD). By analyzing data on gene expression levels in both male and female subjects from the single soma dataset, alongside secondary research, I aim to determine if there is a noticeable link between gender and AD risk. The results so far indicate no major differences in gene expression between men and women, suggesting that gender may not be a determining factor in AD development.

These findings align with other studies, which suggest that factors such as age and genetics may play a larger role than gender in the risk of Alzheimer’s disease.

Although research suggests that women may be more likely to develop AD, e.g. epidemiological studies have shown that women have a higher lifetime risk for developing Alzheimer's disease (AD) than men. Women in their 60s show significantly faster age-related decline and greater deterioration of cognition than men (Cavedo, E 2018). Other studies argue that this is due to women generally living longer than men rather than any direct biological reason (Mielke et al., 2018). In this study, I hypothesize that gender does not play a major role in AD risk. I aim to test this by examining certain genes associated with Alzheimer’s in male and female subjects to see if there are any meaningful differences.

Prototype

This project focused on six genes that are often linked to Alzheimer’s disease: SLC26A3, RASGEF1B, LINGO1, PDE4DIP, LINC01609, and PHYHIP. I used box and violin plot visualizations to compare gene expression levels between male and female subjects. Additionally, I reviewed findings from secondary researches to support our hypothesis and add context to our findings.

A group of boxes with different colored squares

Description automatically generated![A diagram of different types of gene expression levels

Description automatically generated with medium confidence]()

References

Cavedo, E., Chiesa, P.A., Houot, M., Ferretti, M.T., Grothe, M.J., Teipel, S.J., Lista, S., Habert, M.-O., Potier, M.-C., Dubois, B., Hampel, H., and (2018), Sex differences in functional and molecular neuroimaging biomarkers of Alzheimer's disease in cognitively normal older adults with subjective memory complaints. Alzheimer's & Dementia, 14: 1204-1215. <https://doi.org/10.1016/j.jalz.2018.05.014>

Mielke, M.M., Ferretti, M.T., Iulita, M.F., Hayden, K. and Khachaturian, A.S. (2018), Sex and gender in Alzheimer's disease – Does it matter?. Alzheimer's & Dementia, 14: 1101-1103. <https://doi.org/10.1016/j.jalzå.2018.08.003>