

# Uncovering the Genetics behind Alzheimer's Disease and Sleep: A Co-expression and Evolutionary Analysis

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## *Abstract*

Alzheimer's disease is a fatal form of dementia, and it caused over 120 thousand deaths in the U.S. alone in 2017. Recent studies indicate that sleep deprivation is both a cause and an effect of Alzheimer's disease. Our research investigates the correlation between sleep deprivation and Alzheimer's disease through two stages. In the first stage of the research, the genetic coexpression of Alzheimer's disease-related genes (A-genes) and sleep-related genes (S-genes) across different stages of human development is explored. A general correlation between the expression of these two sets of genes is confirmed and strongly correlated A-gene and S-gene pairs are located, including GATA1 & ALAS2, TF & MOG, etc. In the second stage of the research, the expressions of A-genes and S-genes across different species are compared. Genes with unusual expression patterns in humans compared to those in other primate species are identified, hinting at possible genetic pathways key to solving the mystery of Alzheimer's disease.