



Downregulation of EBV Related Genes for MS

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WHAT IS **MULTIPLE** **SCLEROSIS?**

Multiple sclerosis (MS) is a condition that occurs when the immune system attacks the brain and the spinal cord, causing several cognitive, motor, and sensory impairments.





WHY SHOULD WE RESEARCH MS?

- MS affects an estimated 1.8 million people worldwide.
- There is no cure or known exact cause.
- Though, MS has been linked to Epstein-Barr Virus (EBV).
- We investigate gene expression data isolated from peripheral blood mononuclear cells (PBMC) in MS patients and control patients to identify genes associated with MS to develop therapies.



METHODS

NCBI'S GEO DATABASE

GSE21942: studied gene expression in PBMC from 12 MS patients and 15 control patients.

STRING-DB

Inputted top 250 genes by p-value into STRING-DB to analyze gene ontology and determined a significantly enriched process.

R & RSTUDIO

Made heatmaps to represent associations



GEO2R

MS vs Control patients: sorted the genes based on upregulation, downregulation, and p-value to identify differentially expressed genes that could have implications for MS.

KEGG

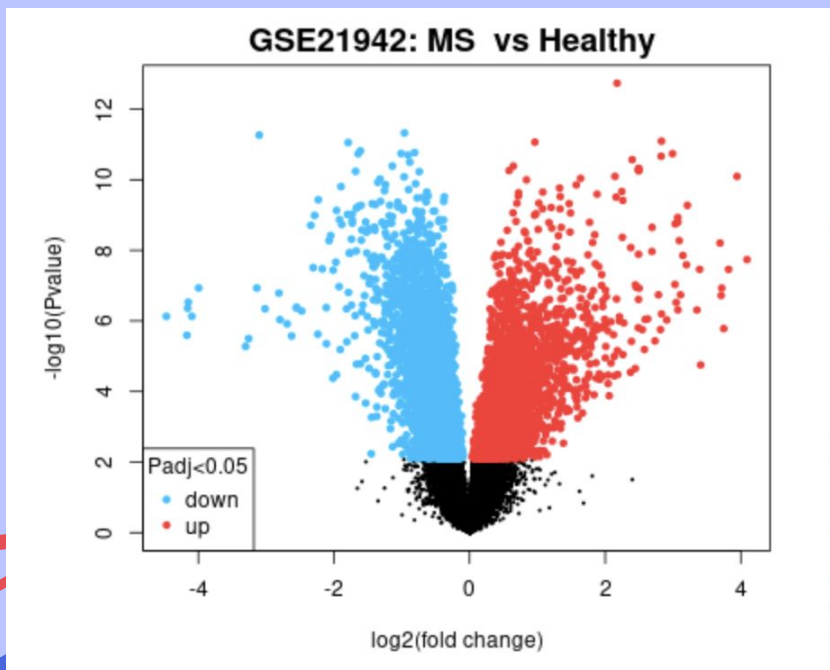
Investigated the gene functional associations between gene pathways and MS.



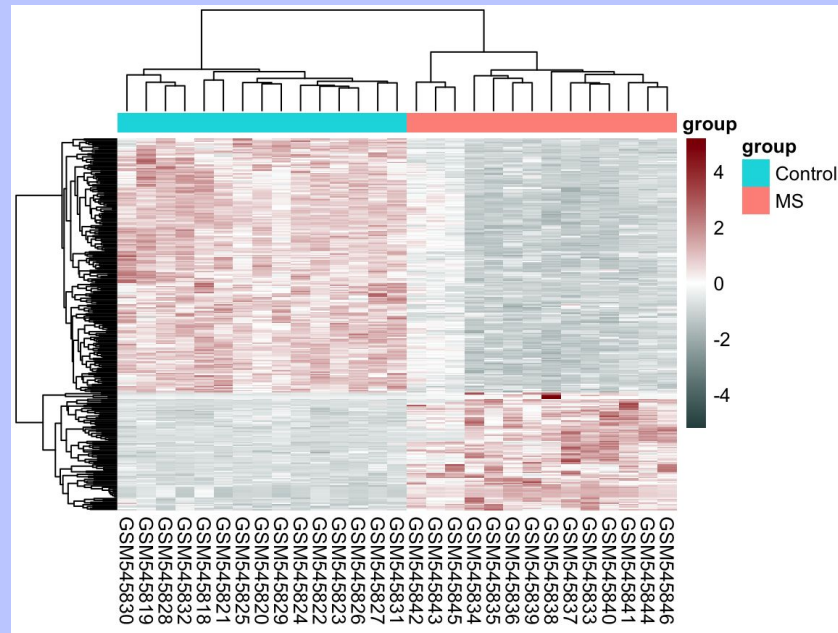
GRAPHS



VOLCANO PLOT



HEATMAP



OUR RESULTS



KEGG PATHWAY

- Used STRING-DB
- Obtained Epstein-Barr Virus infection KEGG pathway
- False discovery rate: 0.0128
- Strength: 0.64.

DOWNREGULATED GENES

- POLK
- STAT2
- STAT3
- TP53

FUNCTIONS & SIGNIFICANCE

- STAT2 & STAT3: regulate cell proliferation and apoptosis
- TP53: regulates tumor growth by preventing uncontrolled cellular proliferation
- All three are significant factors in the development of MS



DISCUSSION OF RESULTS

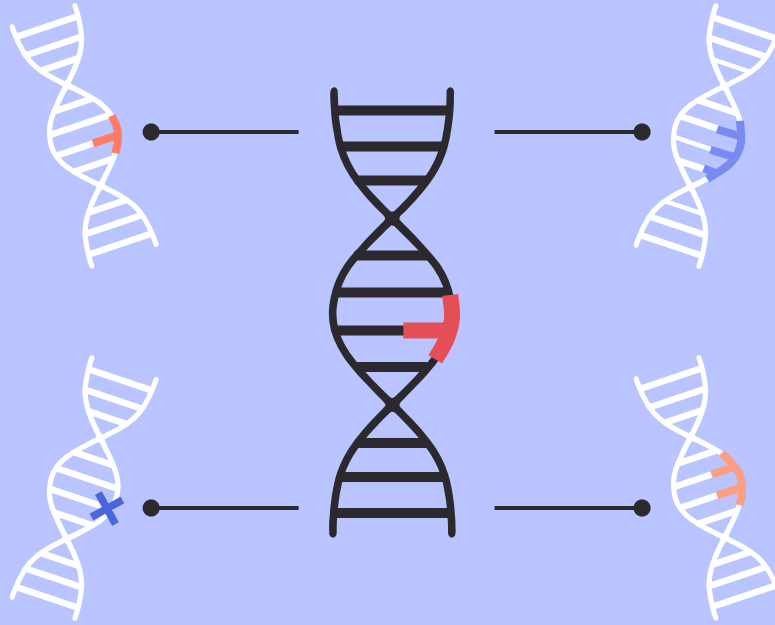
EBV & MS

These results indicate a relationship between the EBV and an increased risk of developing MS.

Previous studies have also identified that EBV increases MS risk significantly.

IMPACT

The association between EBV and MS may allow for the therapies used to fight EBV to be used for MS as well.



FUTURE RESEARCH

Future research could further explore the relationship between EBV and MS to determine diagnostic biomarkers and therapeutic targets for MS.

ADOPTIVE T-CELL THERAPY

Adoptive T-Cell therapy takes pre-existing T-cells from the body and multiplies them in a lab. They are then reintroduced into the body to fight off EBV.

**THANK
YOU FOR
LISTENING**

