

Heart and Brain Gene Analysis

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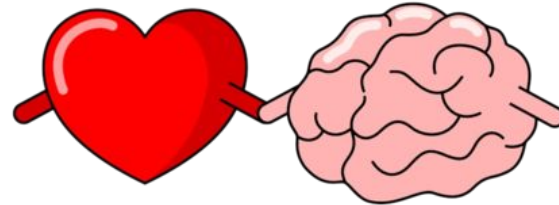
Preview

- Motivation
- Methods
- Why is gene analysis important?
- Heart RIN Analysis
- Brain RIN Analysis
- PCA Tissue Analysis
- Conclusion



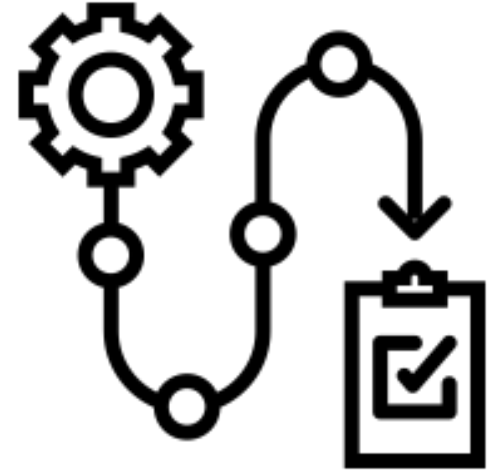
Motivation

- See the connection between brain and heart tissue
- Understand why gene analysis is important



Methods

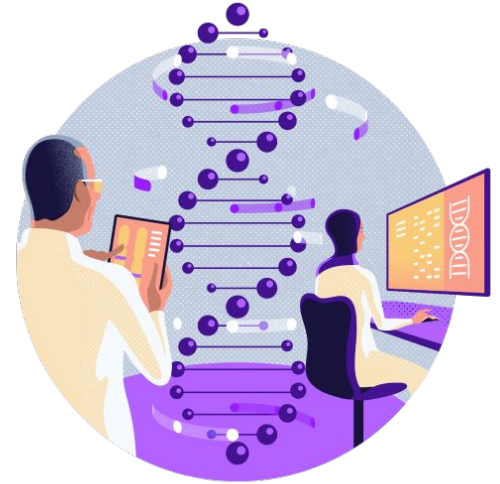
- RStudio with Gene Expression and attributes data
- K-means Cluster Plot



Why is gene analysis important?

Why is gene analysis important?

- It can help us predict disease
- Personalized medicine
- Drug development
- Predictive and preventive healthcare
- Basic biological research
- Agricultural and environmental applications



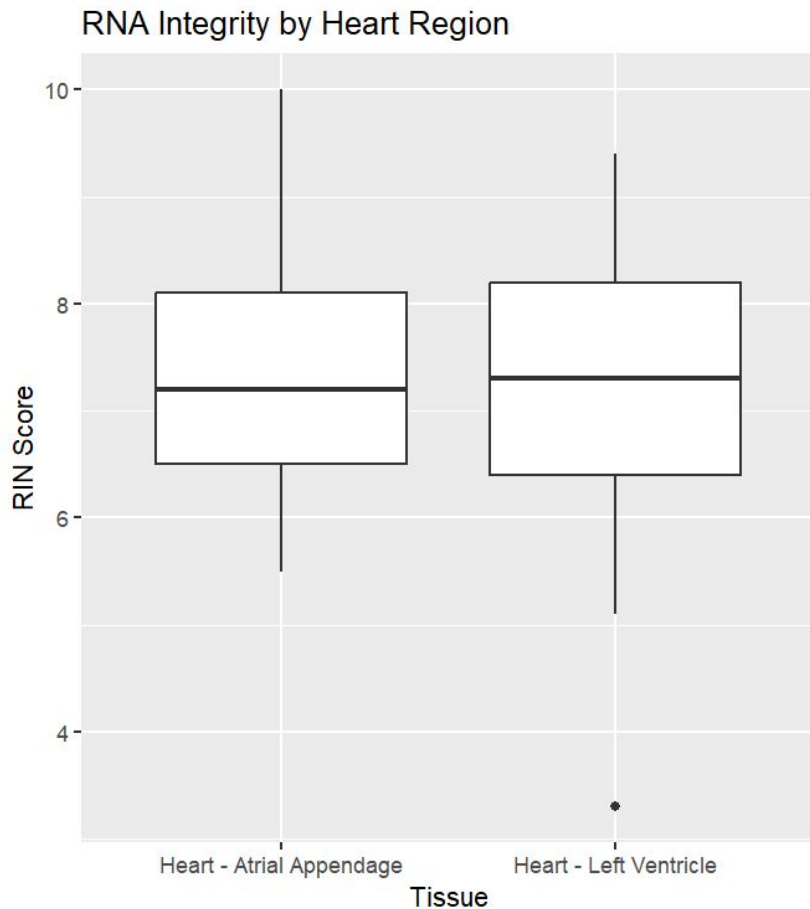
Heart RIN Analysis

Heart RNA Integrity Number (RIN)

> 8.0: Indicates high-quality, intact RNA.

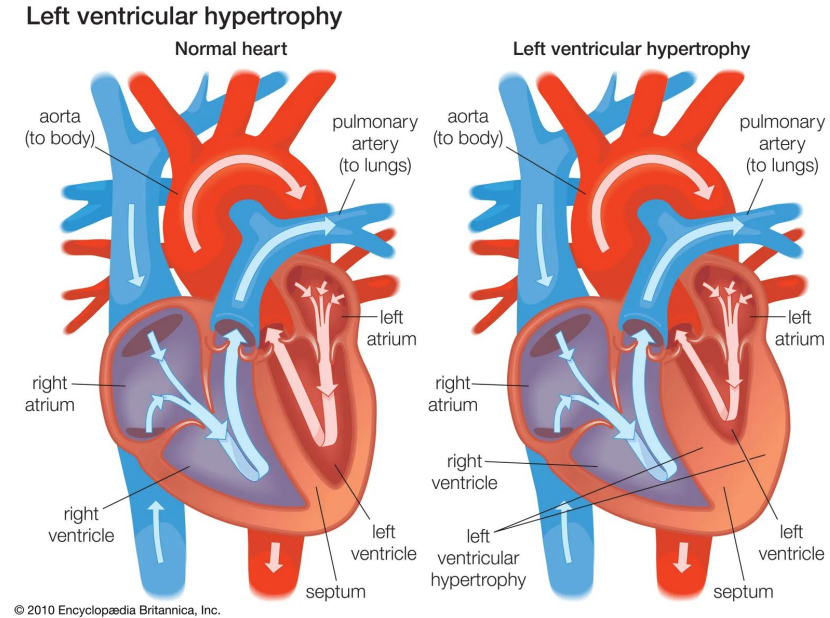
5.0 - 8.0: Suggests moderately degraded RNA.

< 5.0: Indicates degraded RNA, which may not be suitable for certain downstream applications.



Heart RIN Analysis

Both region's samples seem to have moderately to high RIN. With one very low RIN outlier in the left ventricle region. Meaning that patient's tissue is severely degraded, therefore they may have risk of disease such as left ventricular hypertrophy.



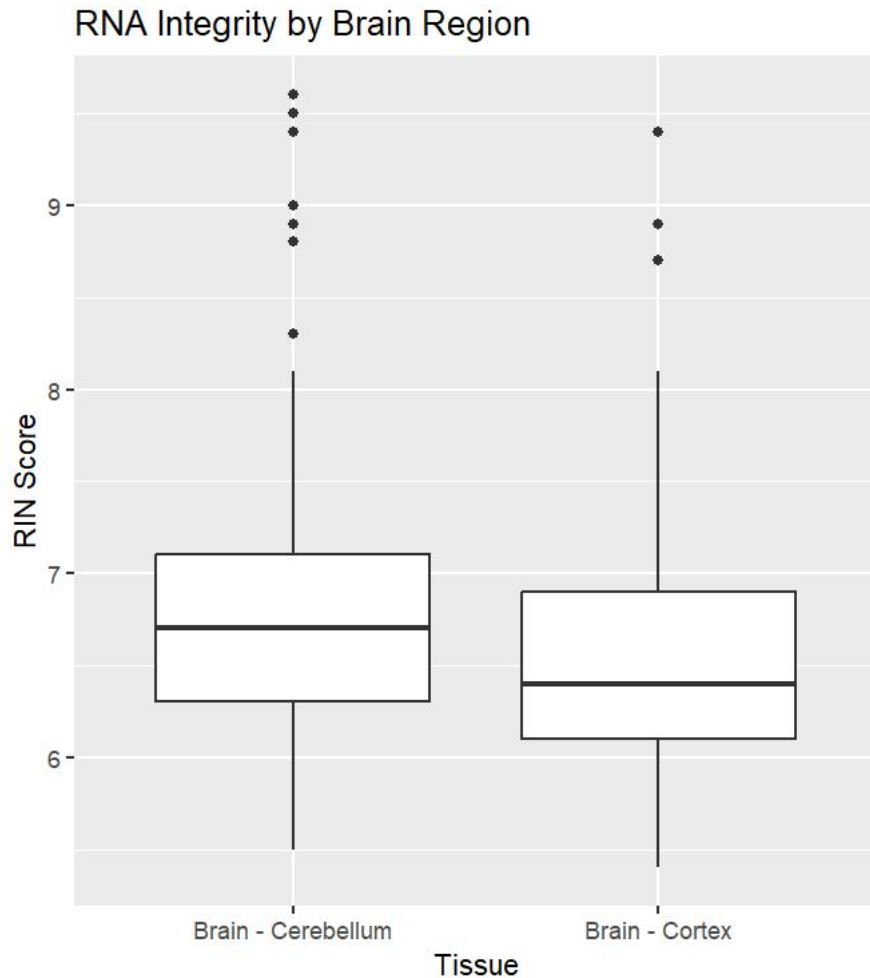
Brain RIN Analysis

Brain RIN

> 8.0: Indicates high-quality, intact RNA.

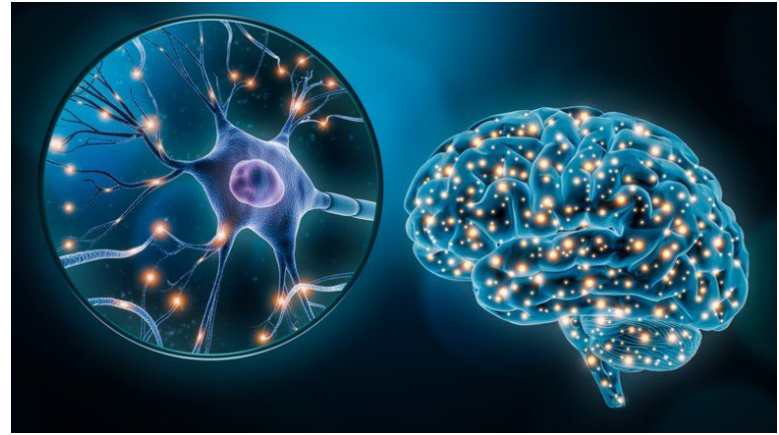
5.0 - 8.0: Suggests moderately degraded RNA.

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Brain RIN Analysis

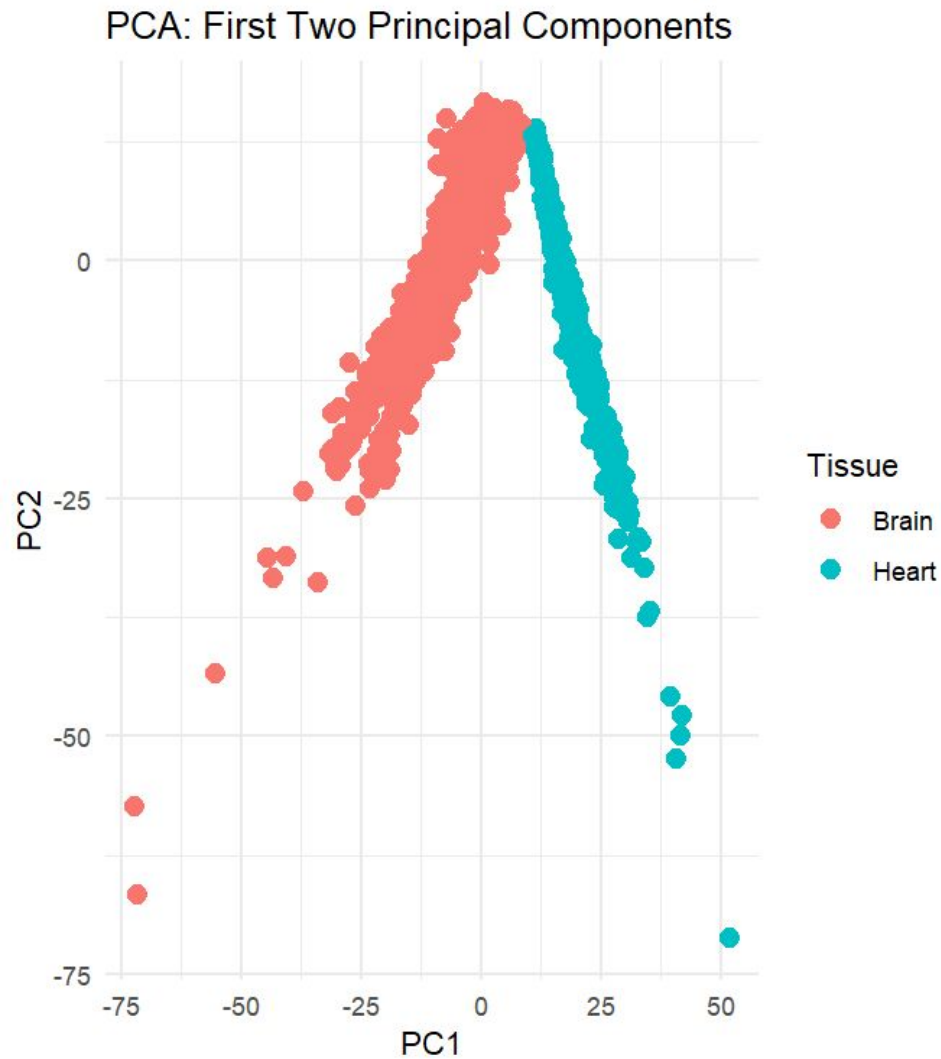
Most patients had moderately degraded RNA on average. Although, there is a lot more outliers than the Heart RIN samples. All being higher than average, meaning less chance of brain disease.



PCA Tissue Analysis

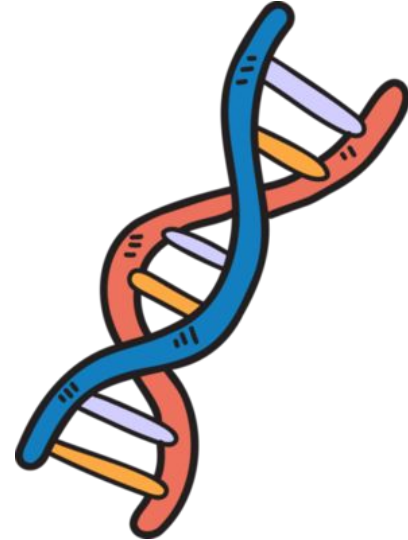
PCA Tissue Analysis (Heart and Brain)

The brain and heart tissues have unique gene expression patterns that are easily separated in the PCA. This shows that the basic components represent significant diversity, with tissue type playing a key role.



Conclusion

- Gene analysis is important for medicine in the future
- Analyzing RIN helps determine whether a patient has good RNA
- PCA tissue analysis shows us how the two types of tissue have significant diversity
- Tissue type is important when analyzing gene expression



Thank you for your time!