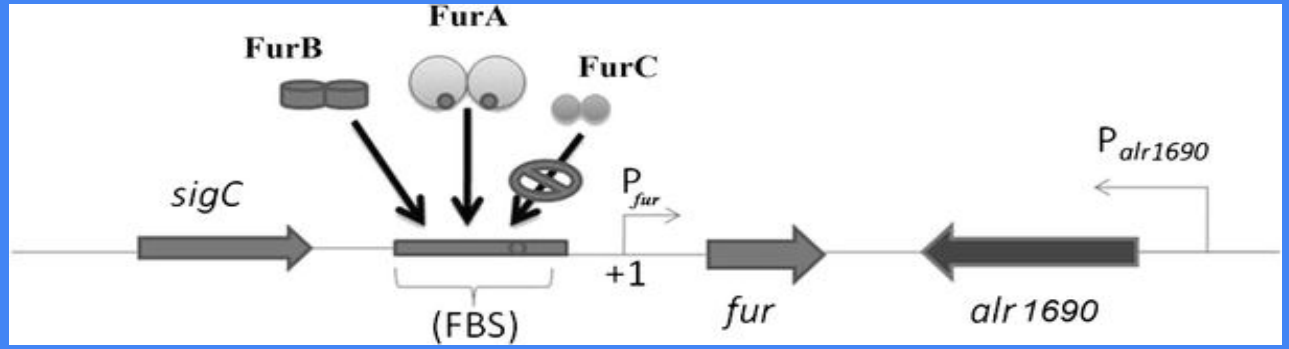
WT vs FurC Mutant in *N. gonorrhoeae*

Transcriptome Analysis



Briteal Varda

Background and Purpose

- Comparing WT *N. gonorrhoeae* with a mutant strain
- FurC, Ferric Uptake Regulator, which helps control how much iron is used by the bacteria
- Understanding bacterial adaptation mechanisms:
  - Changes in iron levels
- *N. gonorrhoeae* affects humans so it has clinical importance
  - Virulence Factors

Methods: Preprocessing and Terminal

Initial Files:
- FASTQ Files, raw reads
- GFF Files, annotation files

Alignment to Reference
- .sam files

Conversion to .bam:
- Binary format for storage

StringTie:
- Assembly of transcripts
- Estimate abundance

Files for Ballgown:
- Generate TXT file with GTF data

Merge GTF file
- Merge all transcript assemblies into one

Generate Ballgown Folder
- Format files into ballgown usable versions
  - stringtie_merged.gtf
  - sorted.bam

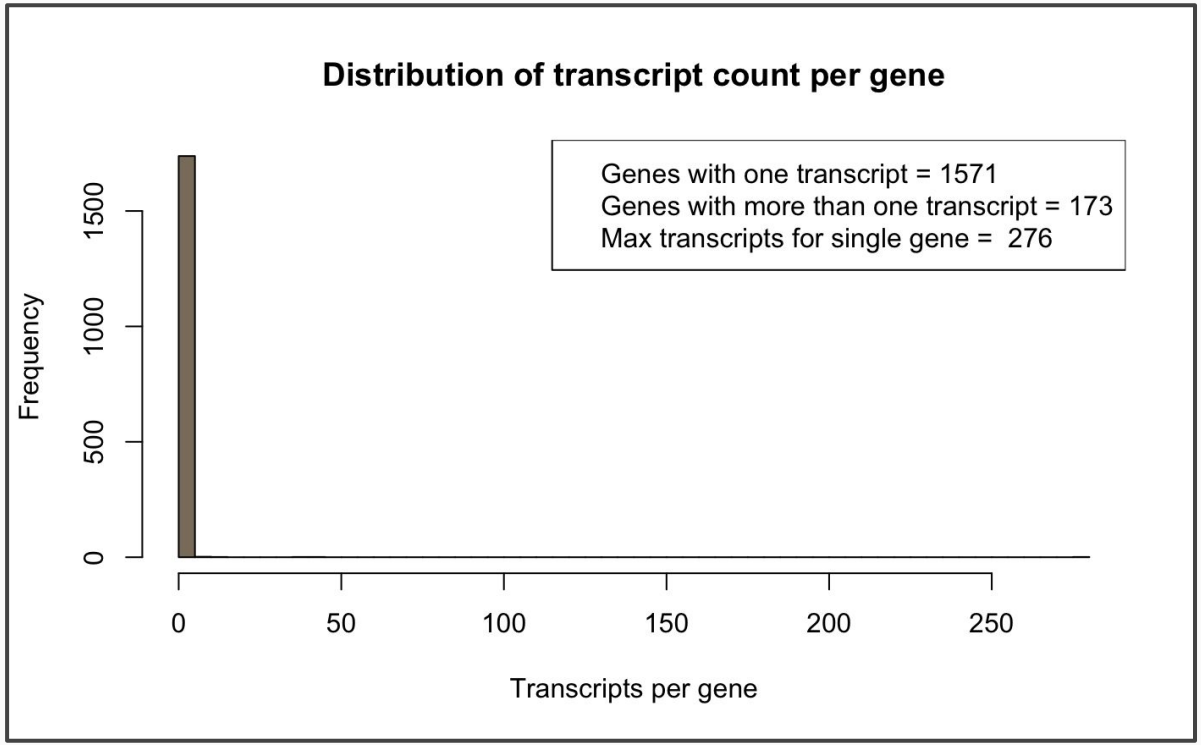
Methods: 3 Main Functions of R Studios

1) Import data from preprocessing
    - Filter data
2) Statistical analysis on data
3) Generate Visuals
    - Tables
    - Customizable Graphs

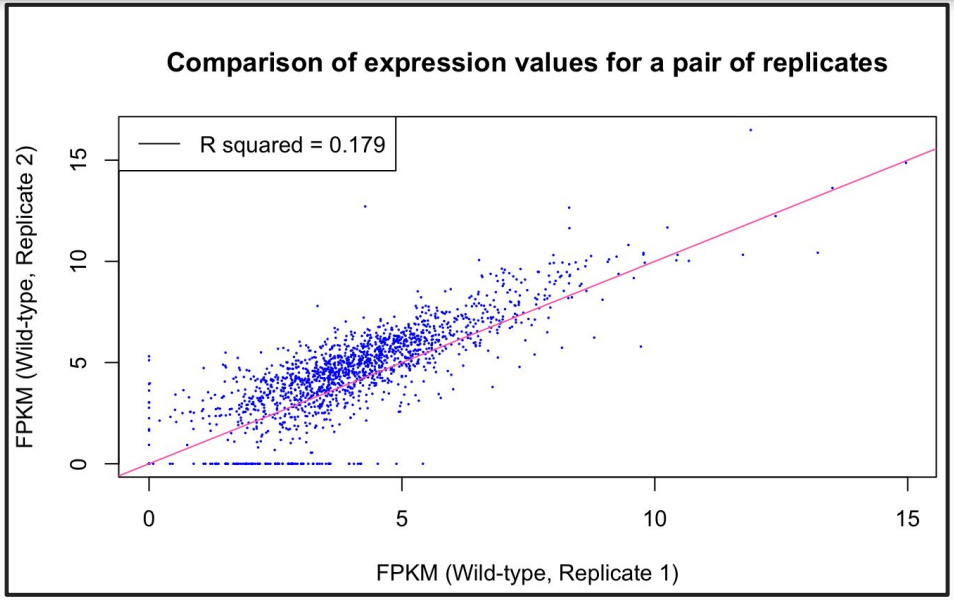
Results

Transcript Count per Gene

- Most genes have only one transcript
  - Majority have simple expression patterns
- 173 genes may be a result of alternative splicing

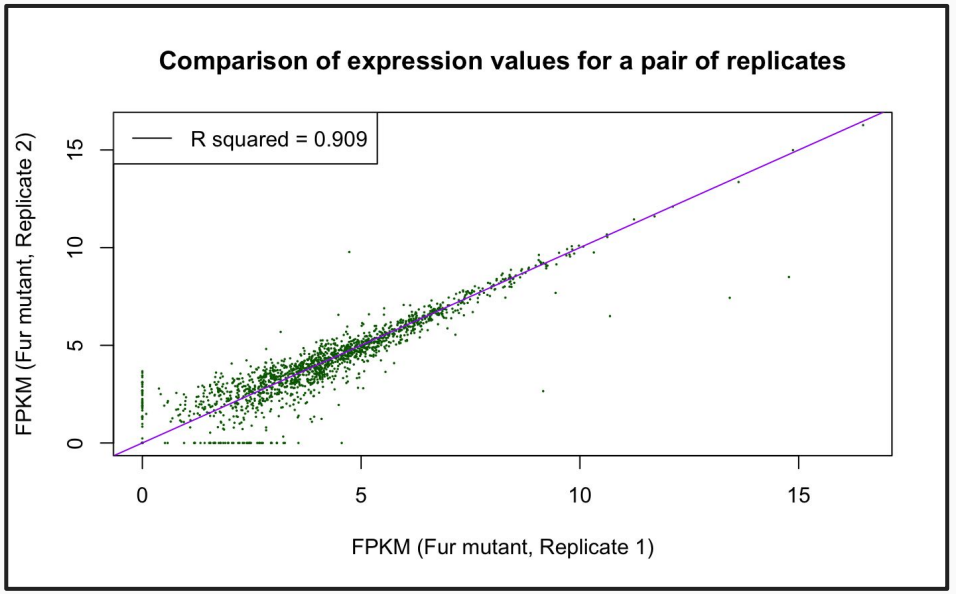


Results



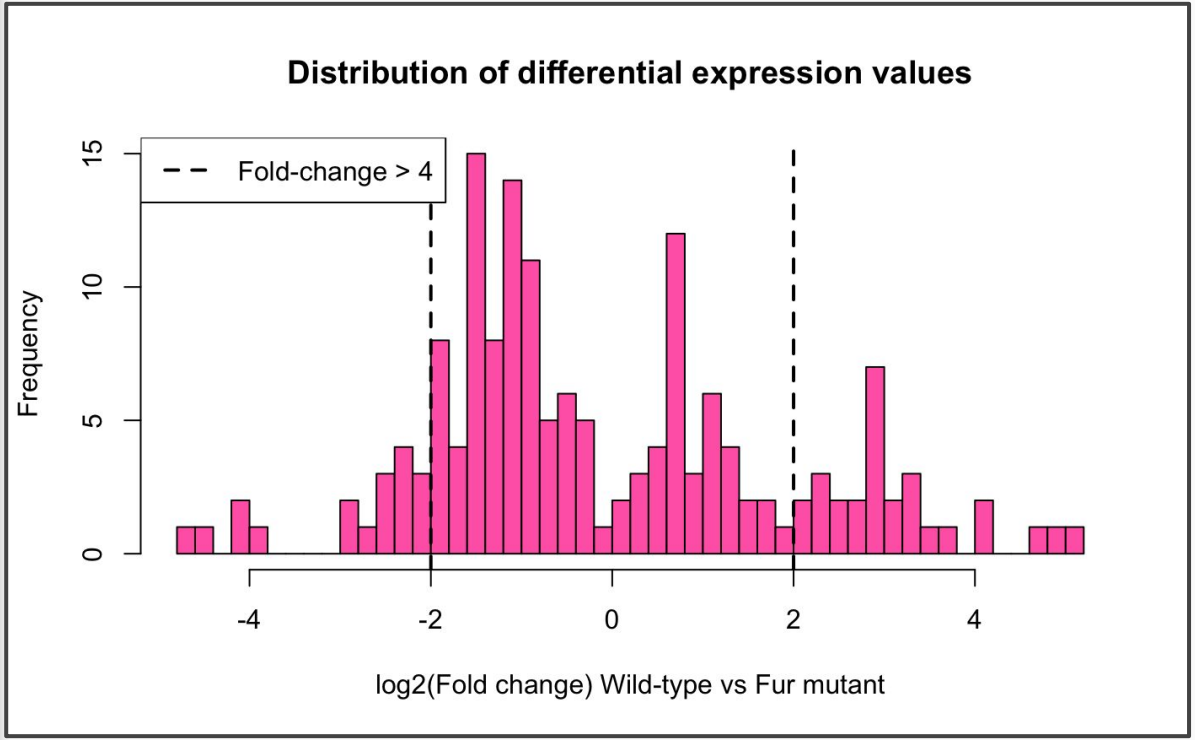
- Wild-type replicates
  - Low correlation
  - Low reproducibility

- Fur Mutant replicates
  - High correlation
  - High reproducibility



Results

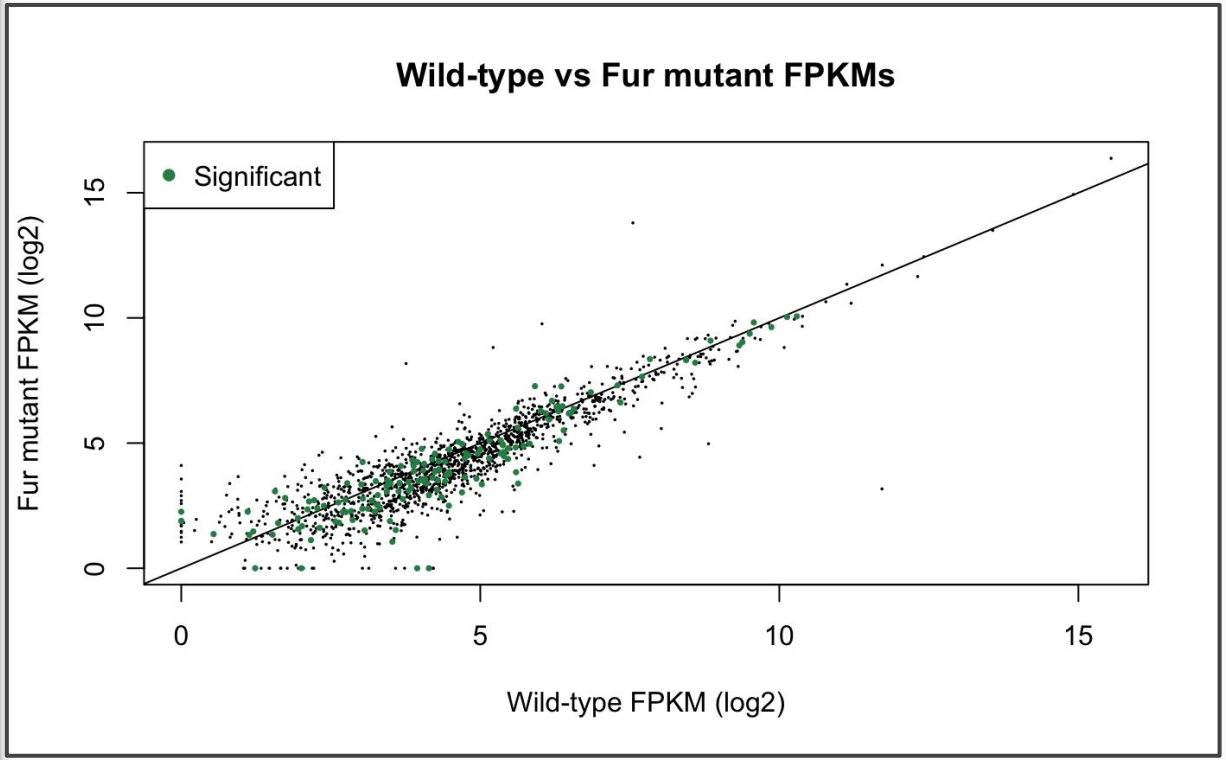
- 0 fold change has fewer genes meaning fewer genes are unchanged
- FurC Mutant shows significant changes in gene expression (+2)
- Highlights potential critical pathways that are affected by FurC



Results:

Gene Expression Levels:

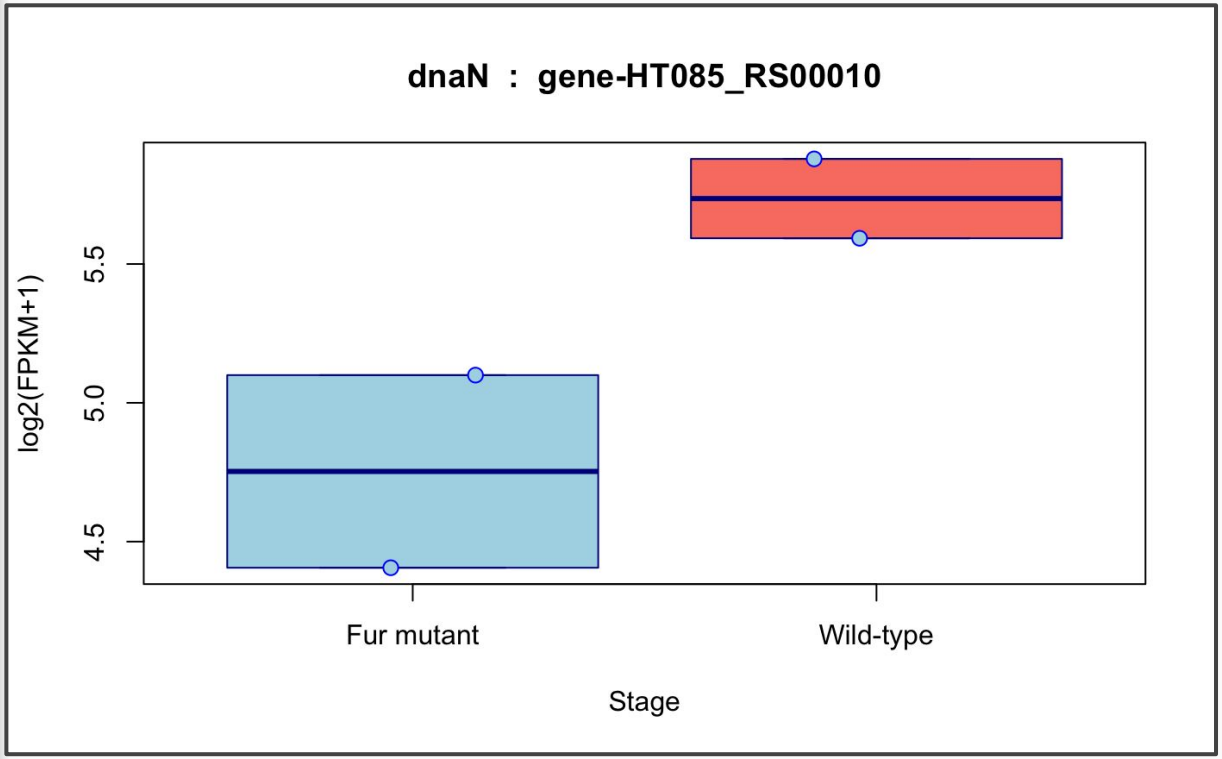
- Significant genes shows Fur mutation affects only some
- Overall, most genes are expressed at similar levels



Results:

dnaN BoxPlot:

- WT shows high expression of dnaN
- dnaN is downregulated in Fur Mutant
- Essential for DNA replication
    - FurC impacts replication and cell division



Conclusion and Significance

- Understanding ability of *N. gonorrhoeae* to survive in iron-limited conditions like human host
- Bacterial stress response in terms of Fur regulation