cmQTL pilot, Variance Analysis

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Data

- Two time points: 6 or 24 hours
- Four densities at each time point
  - For 6 hrs: 5000, 10000, 15000, 20000
  - For 24 hrs: 1000, 2000, 3000, 4000
- Three different aggregated measurements per well:
  - All cells
  - Isolated cells
  - Colonized cells
- Additional covariates: proportion of isolated cells/well
  - Also have well ID, but didn’t use it

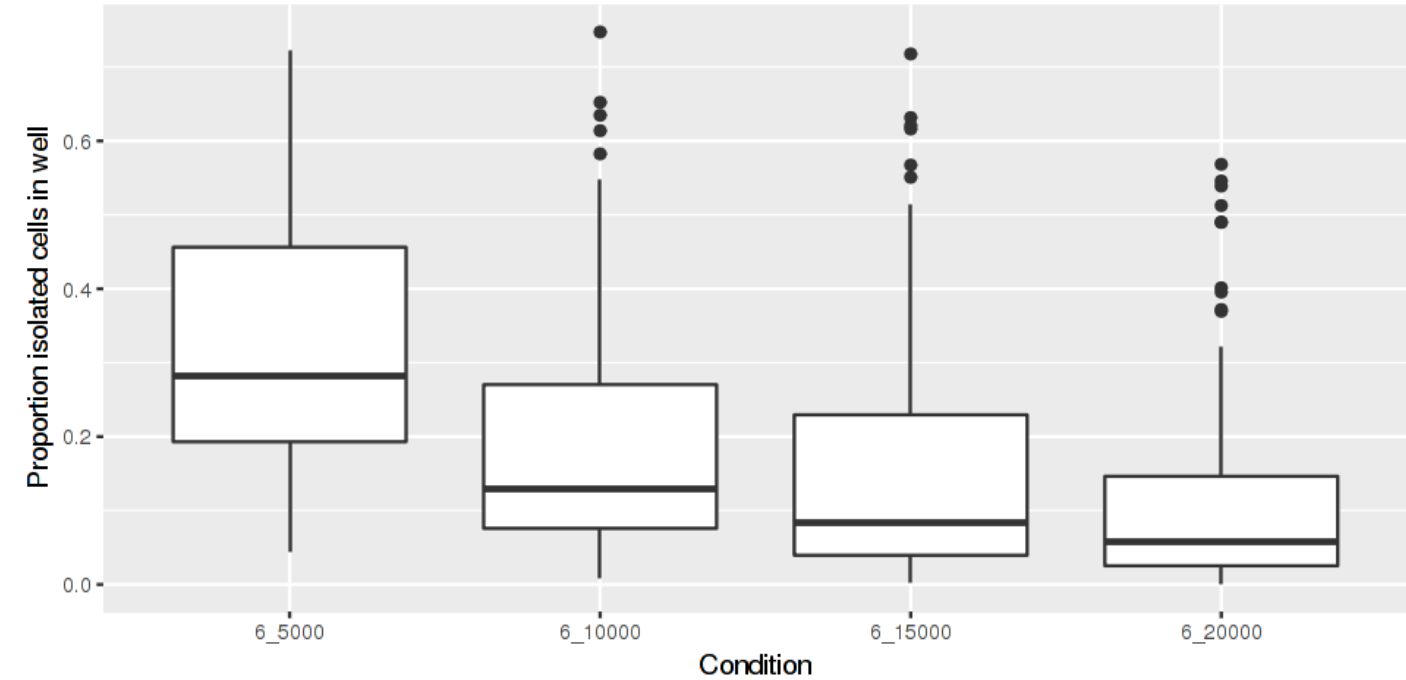
1. Is there a relationship between cell line and colony formation?

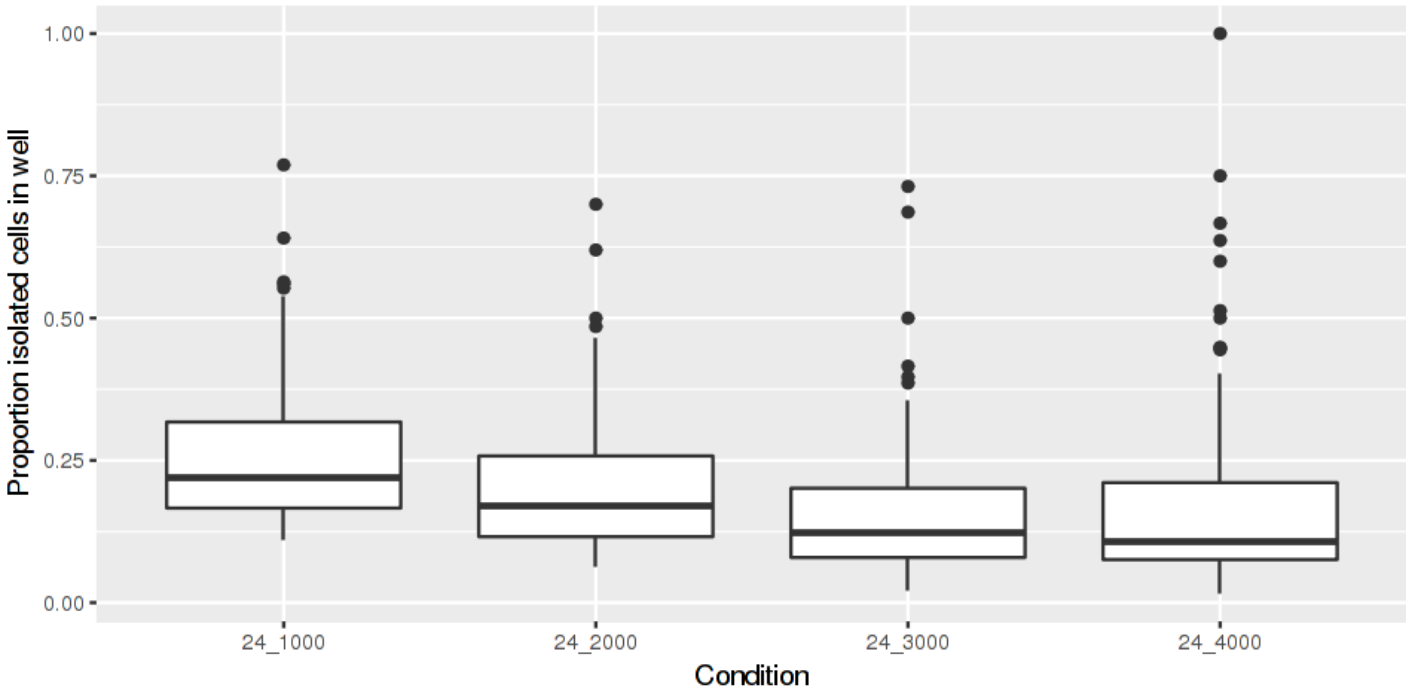
Mixed effects model with random effects for cell line and density

proportion.isolated ~ 1 + (1 | cell.line) + (1 | density)

```
Random effects:
 Groups                                  Name        Variance Std.Dev.
 pilot.metadata.6$Metadata_line_ID       (Intercept) 0.024804 0.15749
 pilot.metadata.6$Metadata_plating_density (Intercept) 0.008017 0.08954
 Residual                                            0.008556 0.09250
```

~60% of variance in proportion of isolated cells (in a well) is explained by cell line


Proportion isolated cells in well
0.0
0.2
0.4
0.6
6_5000
6_10000
6_15000
6_20000
Condition


Proportion isolated cells in well
0.00
0.25
0.50
0.75
1.00
24_1000
24_2000
24_3000
24_4000
Condition

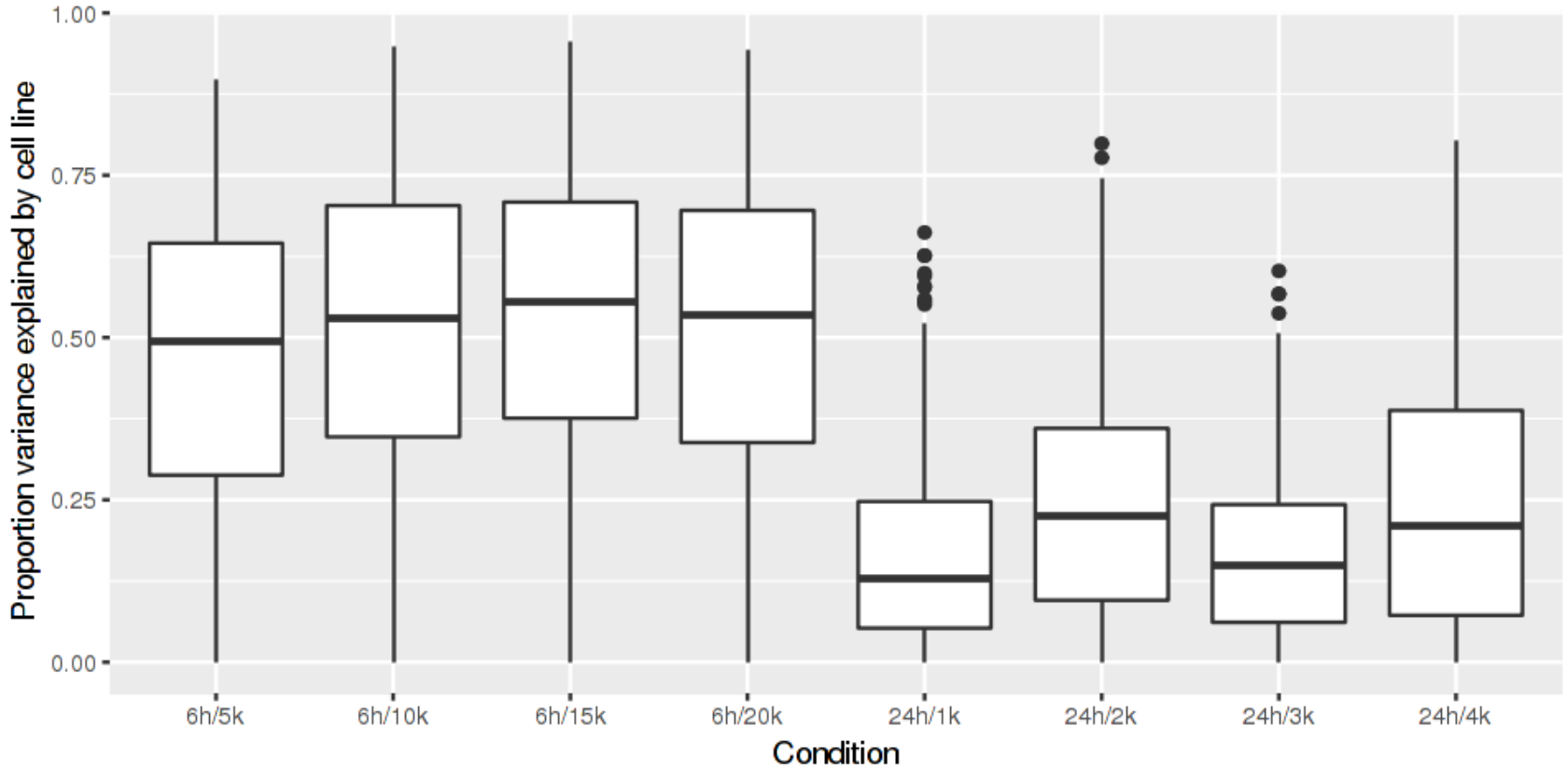
2. How does variance explained by cell line vary between conditions?

For each condition, a mixed effects model for each trait with random effect for cell line

trait ~ 1 + (1 | cell.line)

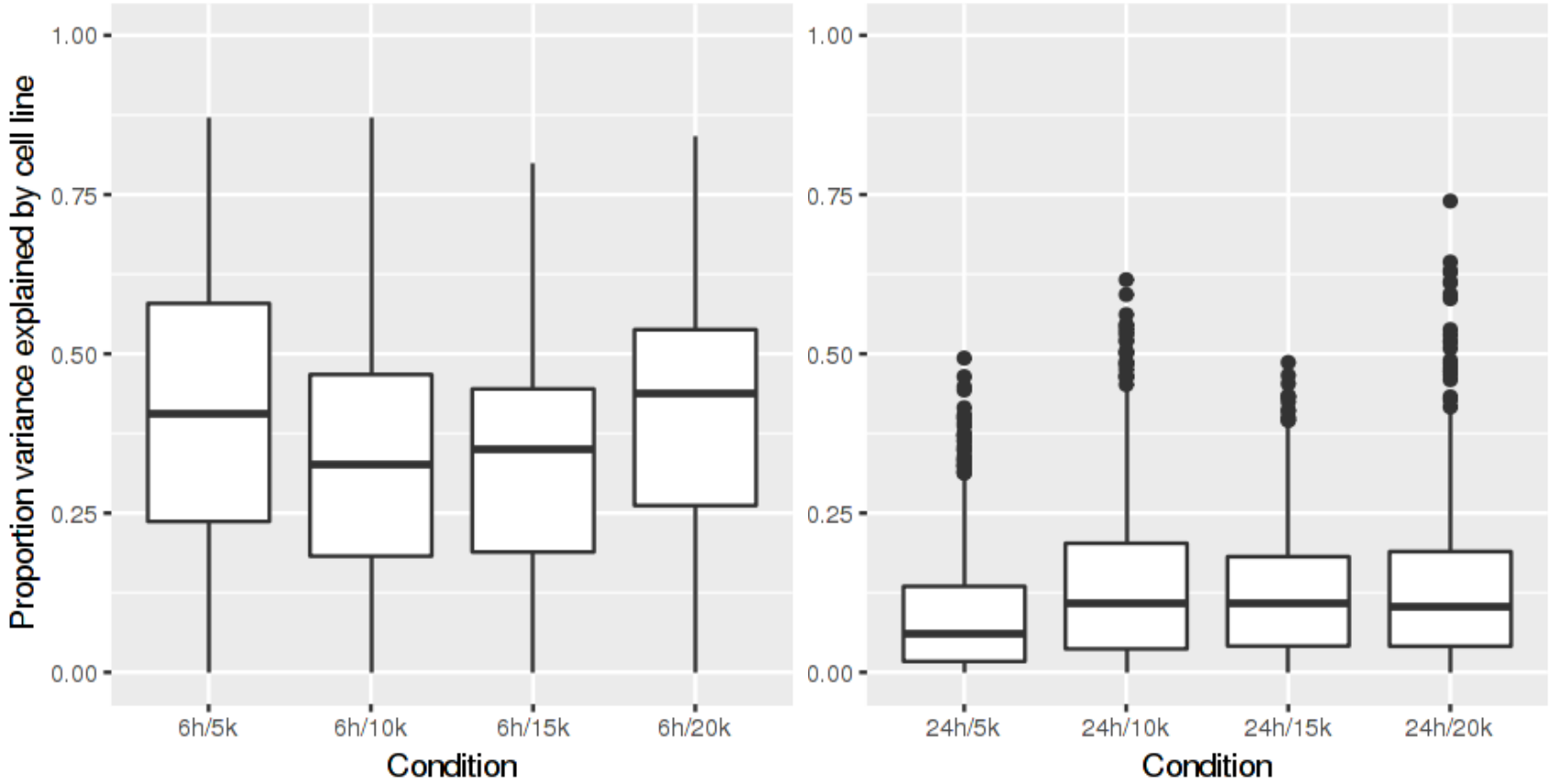
2. How does variance explained by cell line vary between conditions?

First, in data aggregated from all cells in each well:



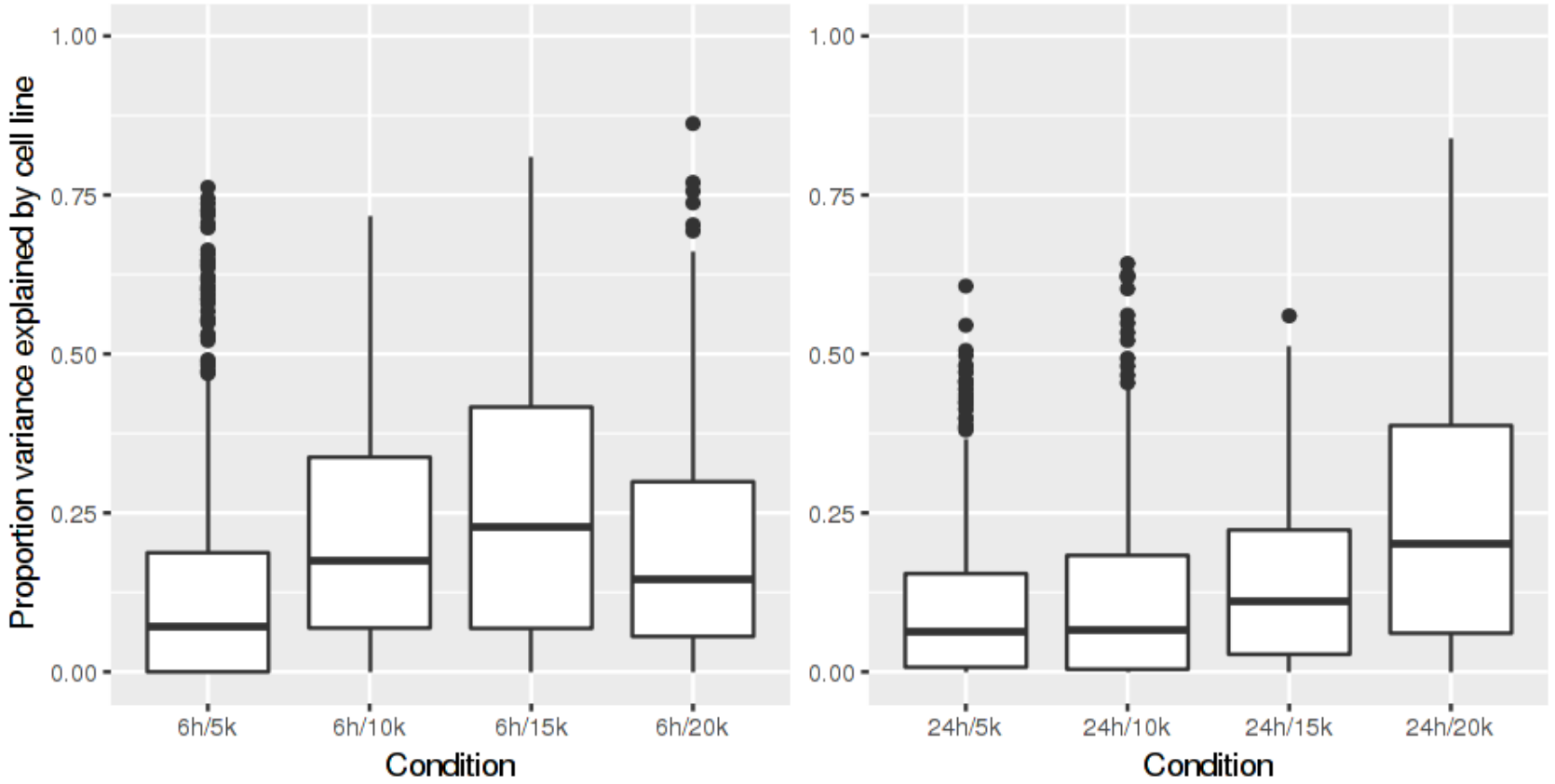
2. How does variance explained by cell line vary between conditions?

Only aggregated over isolated cells in each well:

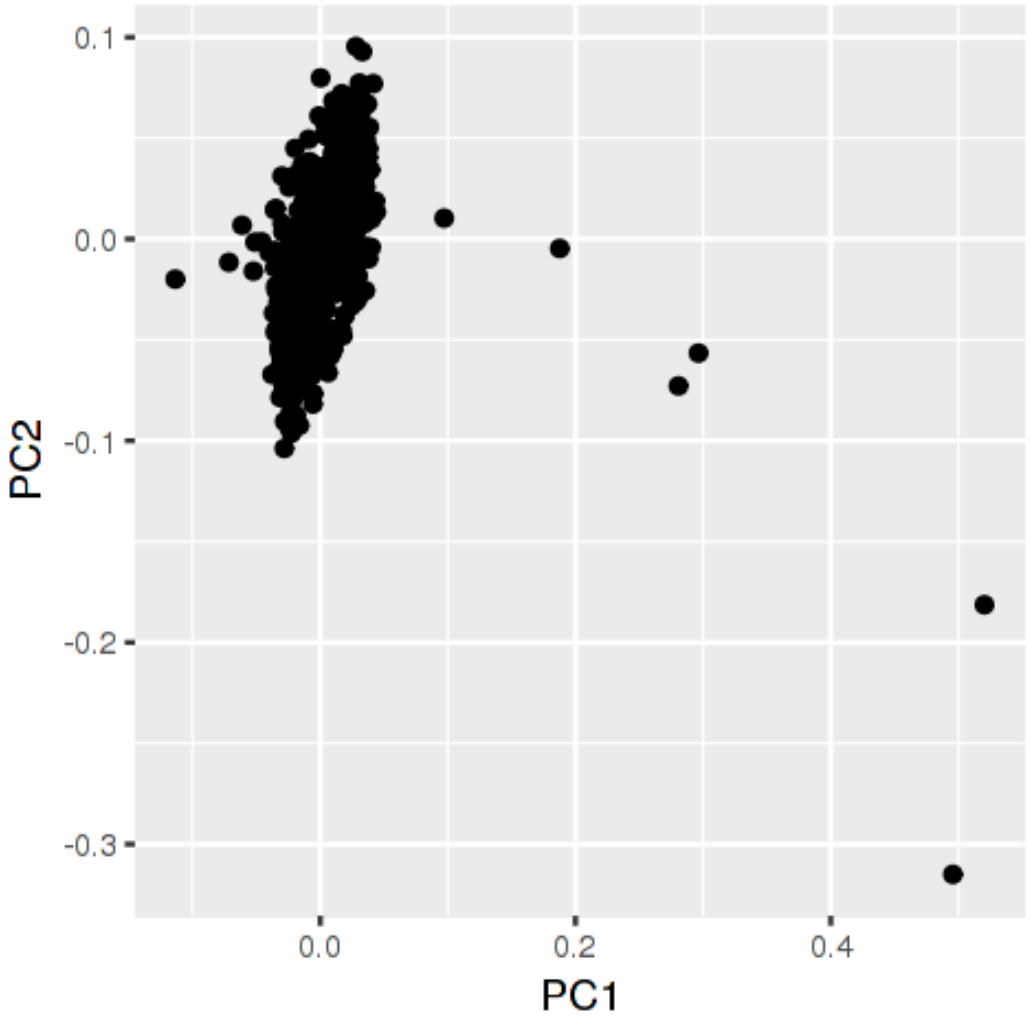


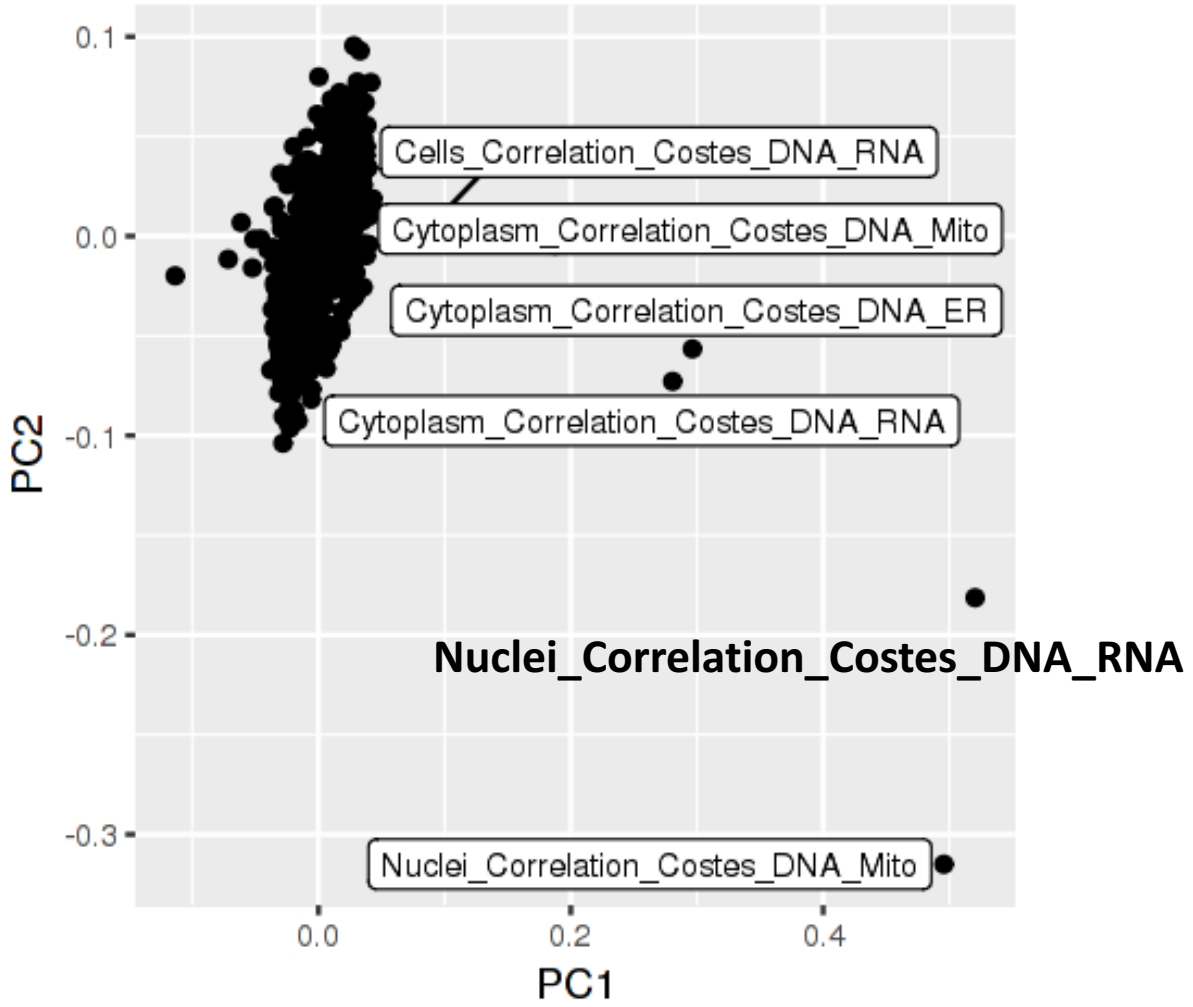
2. How does variance explained by cell line vary between conditions?

Only aggregated over colonized cells in each well:



3. Are any traits outliers?





Conclusions

- Cell line does influence proportion of isolated vs. colonized cells
- More variance is explained by cell line at **6 hours** than at 24 hours
- More variance is explained by cell line in **isolated cells** than in colonized cells
- Aggregating all cells/well, all densities have similar variance explained by cell line
- Chosen condition (6h/10k) is comparable between isolated and colonized cells
- Outlier traits are measurements of correlated signal between different channels