Final Presentation SBiP 2019

Group 7
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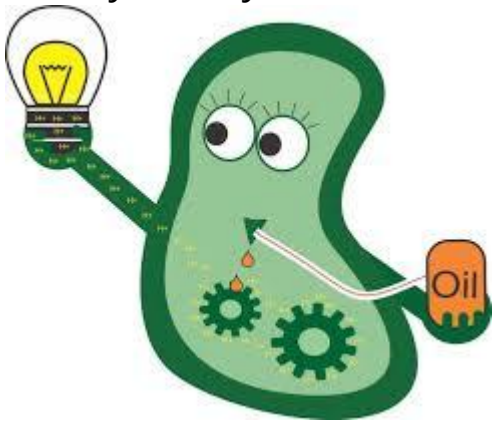
Introduction

- Green factories
- Sustainable production of commodities
- *Experimental model:*

Synechocystis PCC6803



Introduction

How to improve the production of desired targets?

- Getting insight into stress response of *Synechocystis* sp. PCC6803 can help
- Mild stress conditions could be more probable in industrial environments.

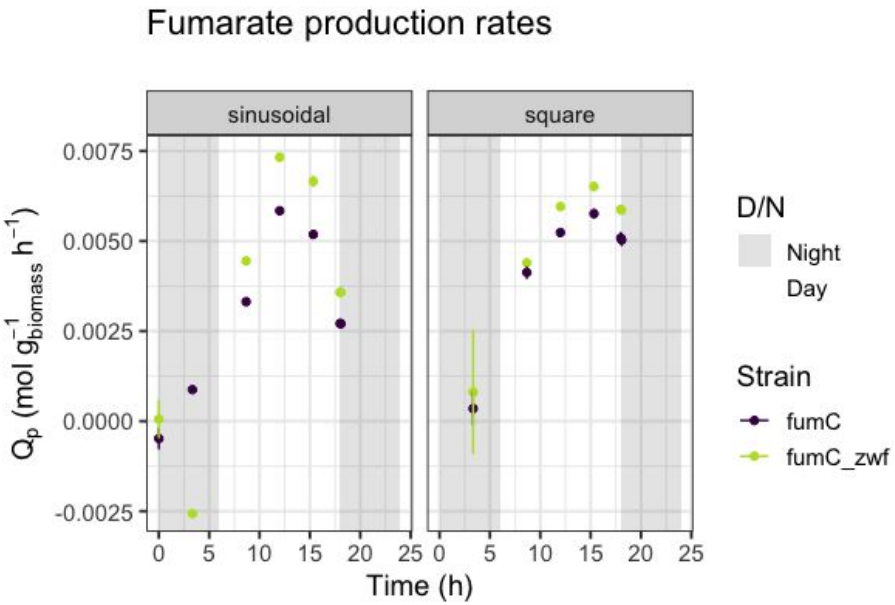
Research question

What effect do different mutant strains and regime light type conditions have on the stress response in *Synechocystis* sp. PCC6803?

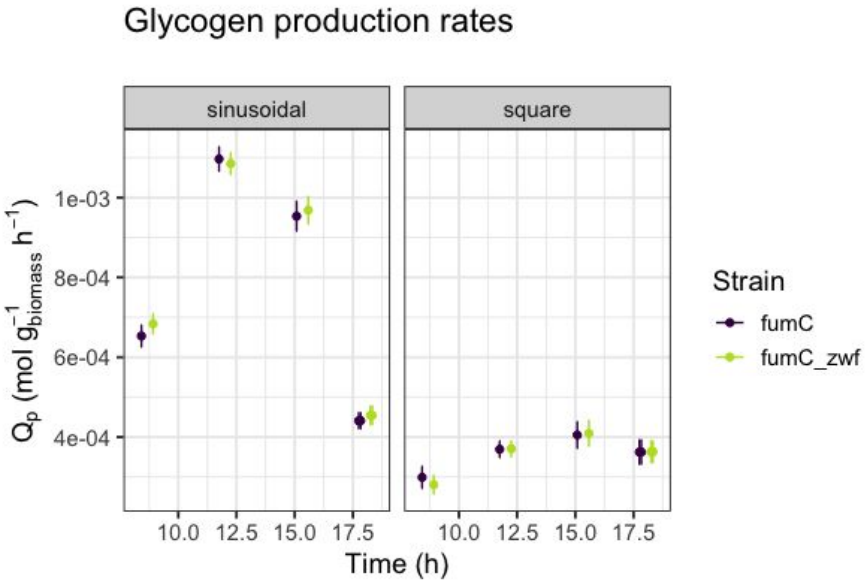
Different approaches:

- Microbiology
- Transcriptomics
- Proteomics

Microbiology



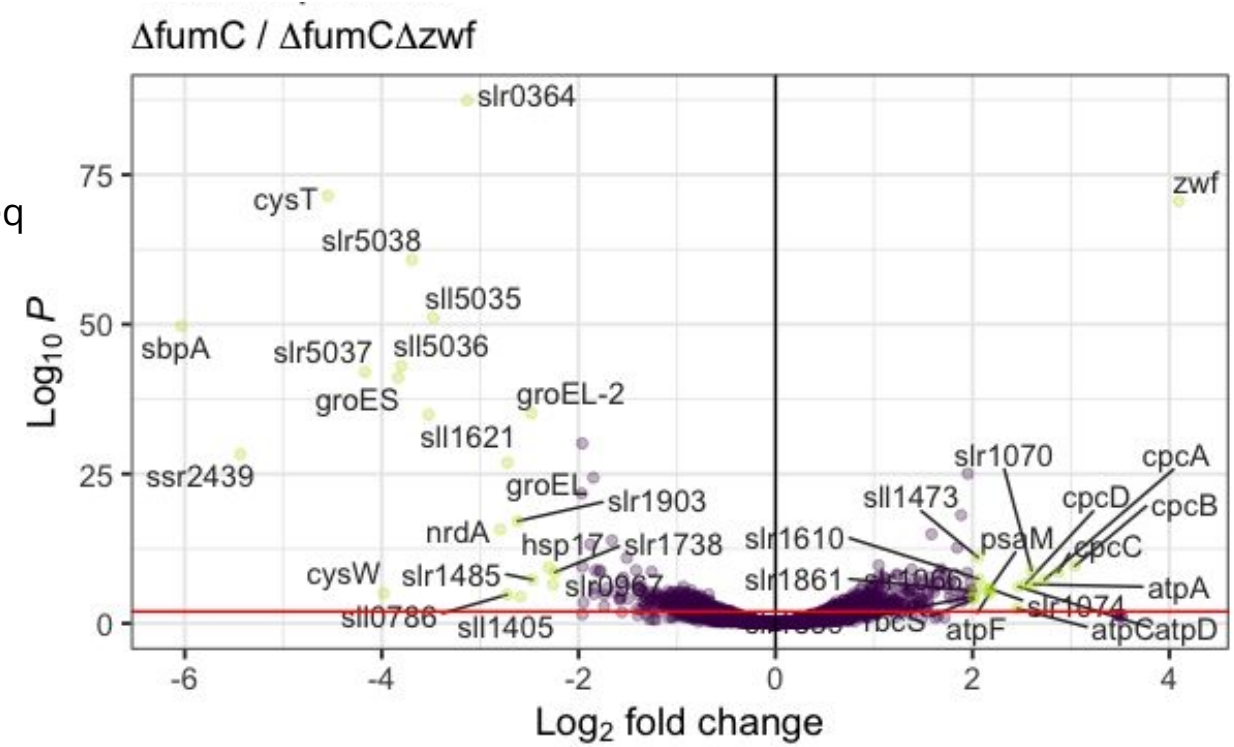
The ΔfumCΔzwf strain achieves higher fumarate production rates during the day,



The glycogen production rates increases during the day for both regime types

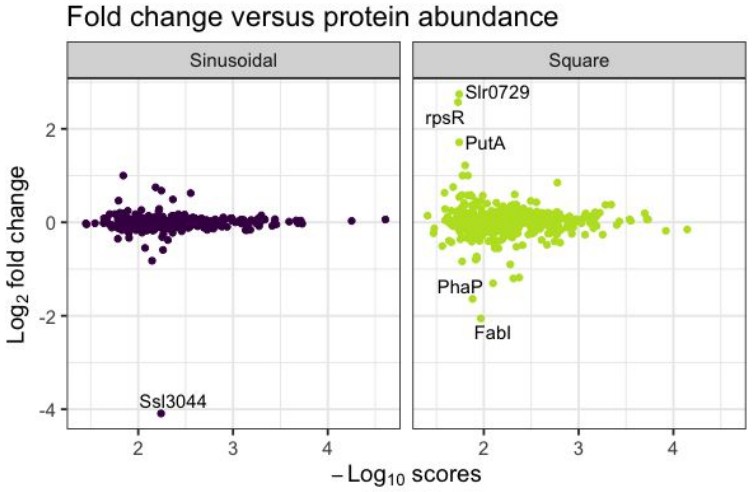
Transcriptomics

Using DESeq Method

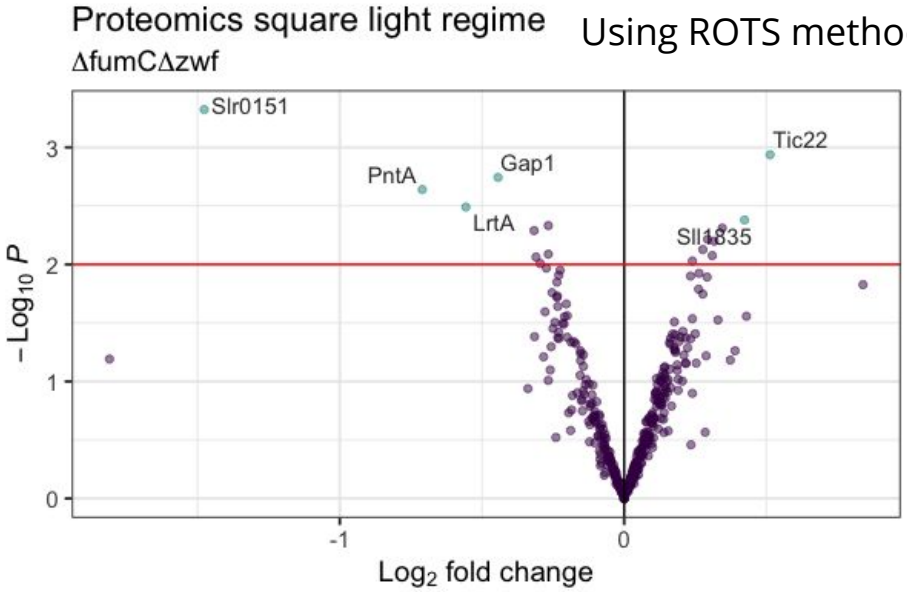


Heat shock genes: groES, groEL-2, groEL, hsp17. More expressed for **ΔfumCΔzwf** strain in comparison with **ΔfumC** strain.

Proteomics



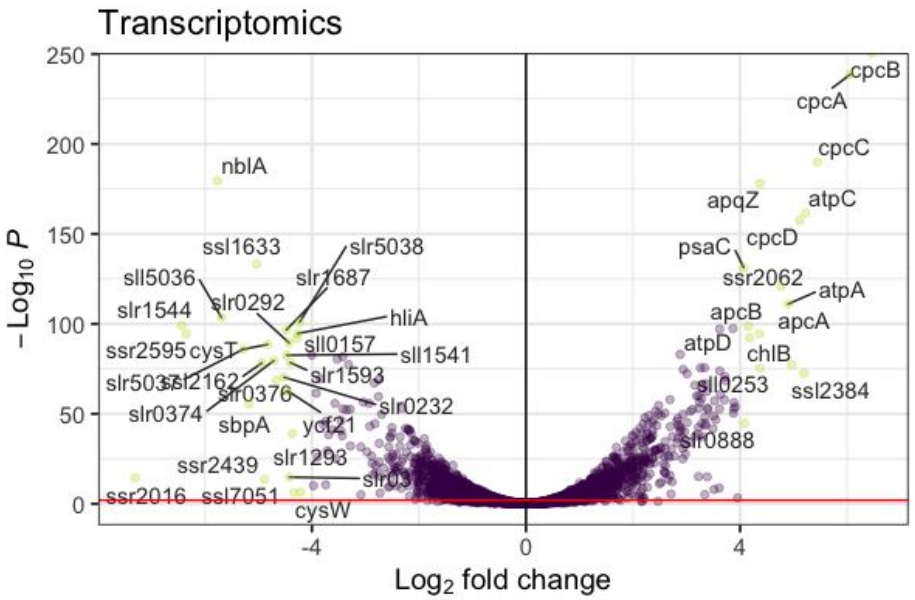
Some **differentially expressed** proteins especially for the square light regime, fold change is day over night

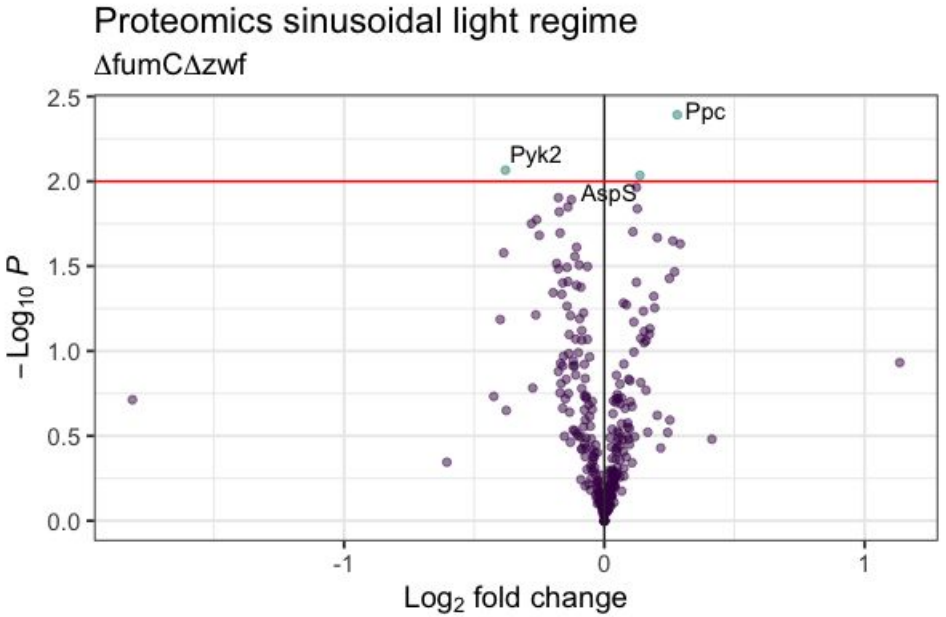


Using ROTS method

5 out of 17 **significant proteins** were labeled that had reasonable fold changes, fold change is day over night

Transcriptomics & Proteomics





For transcriptomics differentially expression is a **lot more** present, fold change is day over night

Conclusions

Significantly lower glycogen production rates under square light regime when compared to the sinusoidal light regime.

The double mutation compared with the single mutation under sinusoidal light regime shows that the ΔfumCΔzwf strain expresses more heat shock genes indicating that they are experiencing more stress.

Most of the proteins found to be differentially expressed cannot directly be linked to a stress response, but for the lrtA, Slr0151 and Tic22 proteins there is a relation to stress response.

Little correspondence between transcriptomics and proteomics.

Further research

Comparison between transcriptomics and proteomics for the square light regime might be more interesting to study.

Apply to Synechocystis:

- Different mutations
- Different environmental conditions

Stress response can be very un-beneficial for optimal production

Finito