



Assessment of manila clam larval survival and physiological changes at 400, 520, and 1000ppm pCO₂ treatments



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Introduction

Ocean Acidification as a result of increasing levels of dissolved CO₂ has been shown to impact the survival, physiology, and morphology of calcifying organisms.

Larval stages are thought to be at particular risk among bivalve species due to their dependences on soluble calcium concentrations

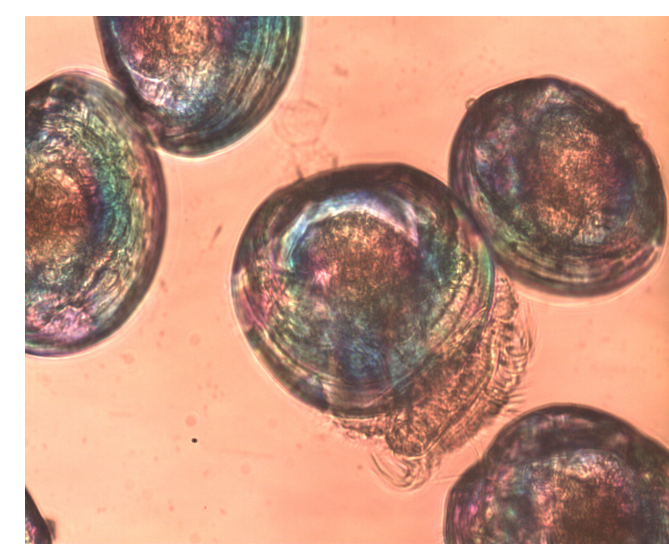
Limited studies exist that focus on the transcriptional response of calcifying organisms as a result of ocean acidification

Goals

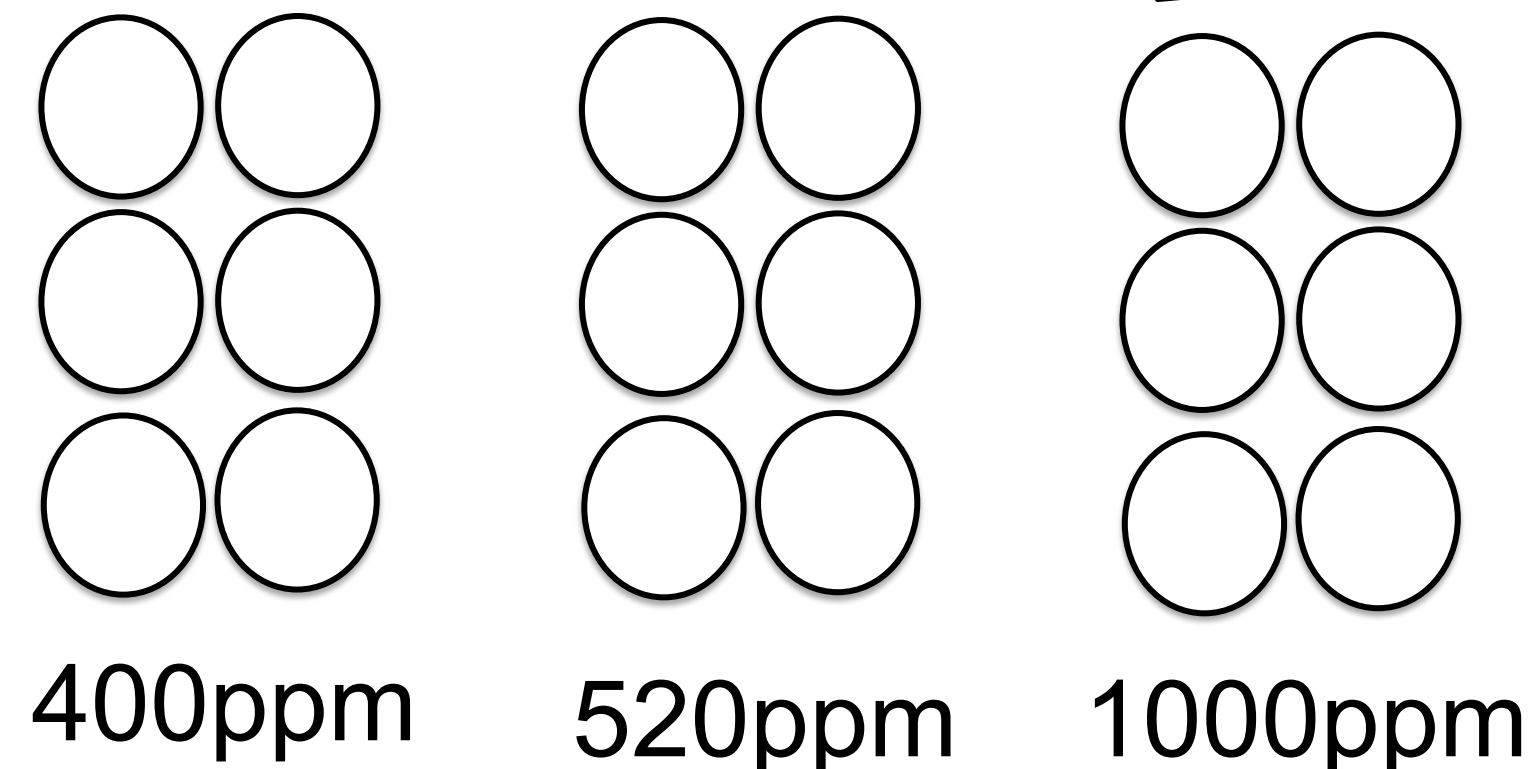
1. Assess the impacts of elevated pCO₂ treatments on clam larval survival and morphology.
2. Identify changes in transcriptome as a result of elevated pCO₂ treatments.
3. Characterize physiological changes at the molecular level as a result of elevated pCO₂ conditions.

Experimental Design

5 day old larvae



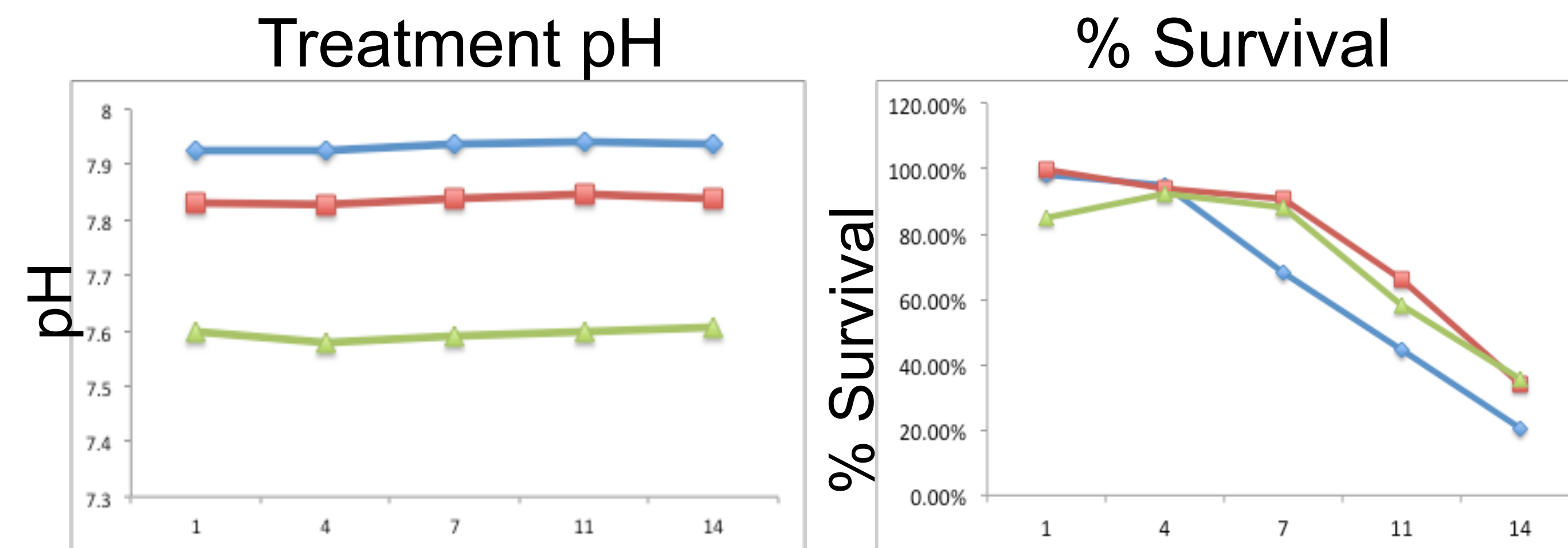
Split into three pCO₂ treatments with 6 replicates/treatment



Take samples for mortality, morphometrics, and qPCR

1, 4, 7, 11, and 14 days

Summary of pH treatments and % survival at 400, 520, and 1000ppm CO₂

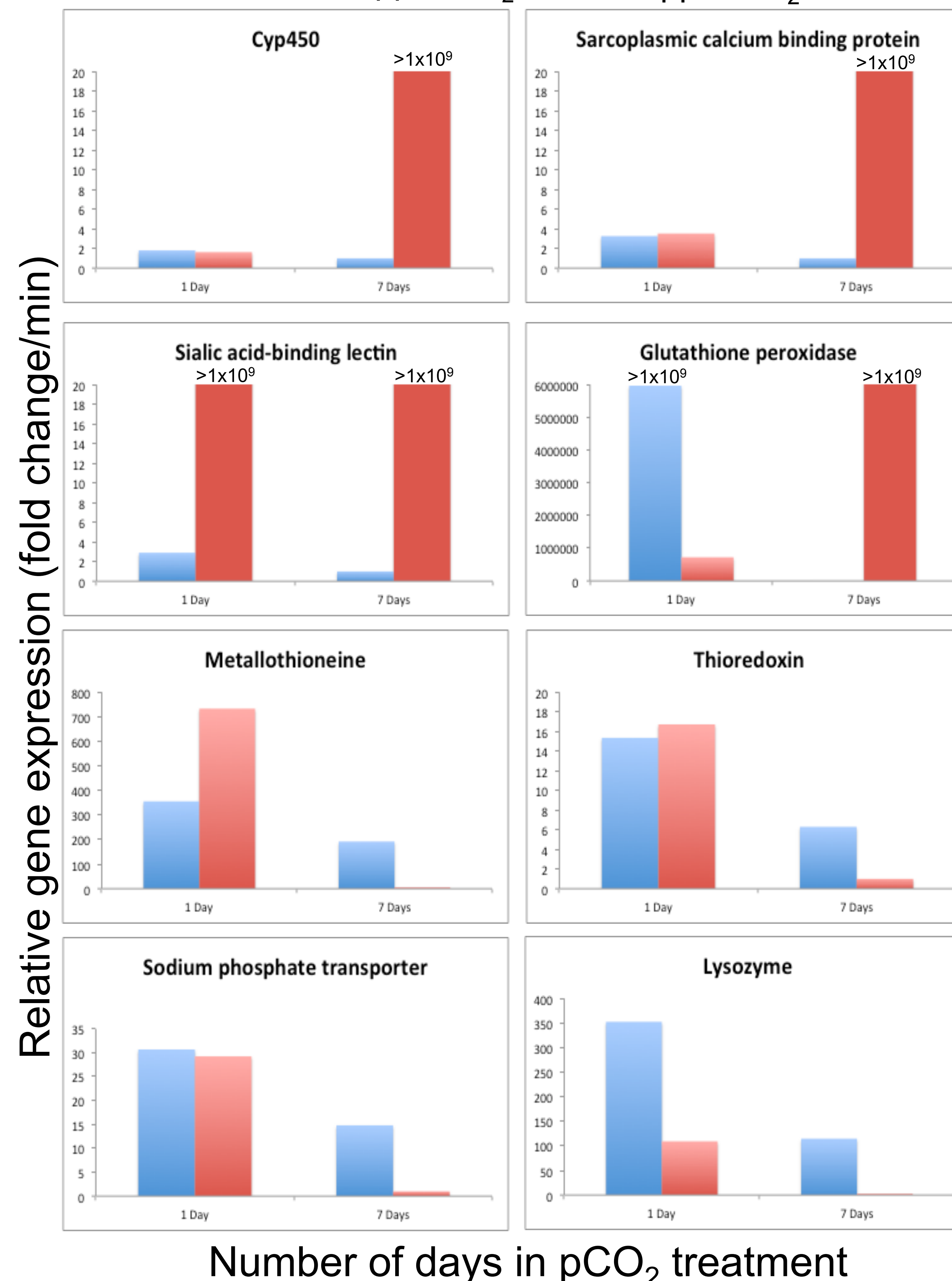


Number of days in pCO₂ treatment

◆ = 400ppm CO₂ ■ = 520ppm CO₂ ▲ = 1000ppm CO₂

Gene expression

■ = 400ppm CO₂ ■ = 1000ppm CO₂



Number of days in pCO₂ treatment

Conclusions

Elevated pCO₂ levels appear to have no impact on 5 day old larval clam survival. Decreased survival at 400ppm (ambient) may have been a result of ciliate contamination in the system.

Gene expression varies widely depending on the physiological function.

Genes associated with stress response and ion transport are dramatically induced after one week of treatment at 1000ppm CO₂.

Future Directions

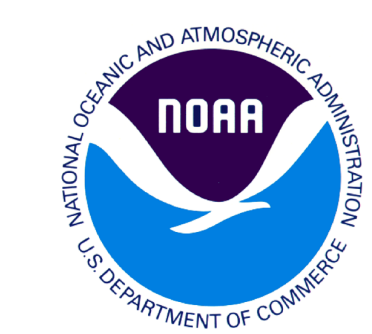
Generate transcriptome libraries from 1 week samples at 400 and 1000ppm CO₂ treatments.

Further validation of qPCR results. More replicates and more timepoints.

Sequence and measure transcripts of genes identified in other organisms (ie sea urchins) that are thought to be impacted by ocean acidification.

Complete assesment of larval growth rates under different pCO₂ conditions.

Acknowledgements



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