Title

Cellular-molecular response to acute hypercapnia mismatch

Mitochondrial and transcriptional underpinnings of hypercapnic change in conditioned and naïve cohorts

Mitochondrial and transcriptional memory response to hypercapnic seawater

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Abstract

Introduction

Methods

F2 scallops conditioned to 400, 800 and 1200 uatm all their life. Important, the cohort of F2 scallops under 1200 uatm was conditioned post-set from those that were reared as larvae under 400 – these were divided into both downwellers at setting stage under 400 and 1200 uatm to have a high pCO2 cohort. Therefore the 400 and 800 uatm cohort was conditioned since embryogenesis whereas the high pCO2 cohort was raised under 400 uatm to st and thereafter under 1200 uatm

90 Adult F2s were tagged March 23rd

* #s 1-30 = 400 uatm (pH 8)
* #s 31-60 = 900 uatm (pH 7.5)
* #s 61-90 = 1200 uatm (pH 7)
* Note: these ‘pH’ calls are not real, just used in our system and in communication for this multigenerational project for ease

Adults were always on drum filter seawater in the basement until 4/16/2023when moved to raw water.

Raw water quantified on 4/18/2023 for algae and read ~11-18 cells mL-1

As of 4/18/2023 we are feeding the same diet at 6 mL minute to each bin. We are discussing the need to supplement algae differently as our algae stock is limited and the F3 larave will soon move downstairs. We may supplement with algae paste if needed alongside our mixed live algal diet

Experiment timeline

* April 26th – pre experiment chemistry full carbonate chem
* May 1st – move animals to treatments, the color indicates the cohort and tag color
  + #s 1-10 = 400 x 400 uatm MATCHED!
  + #s 11-20 = 400 x 800 uatm
  + #s 21-30 = 400 x 1200 uatm
  + #s 31-40 = 800 x 400 uatm
  + #s 41-50 = 800 x 800 uatm MATCHED
  + #s 51-60 = 800 x 1200 uatm

* + #s 61-70 = 1200 x 400 uatm
  + #s 71-80 = 1200 x 800 uatm
  + #s 81-90 = 1200 x 1200 uatm MATCHED
  + Design: there are nine buckets each with the

**Pre experiment**

|  |  |  |  |
| --- | --- | --- | --- |
| **400 uatm** | 1-10 | 11-20 | 21-30 |
| **800 uatm** | 31-40 | 41-50 | 51-60 |
| **1200 uatm** | 61-70 | 71-80 | 81-90 |

**Experiment – EACH TANK HAS 10 INDIVIDUALS!**

|  |  |  |  |
| --- | --- | --- | --- |
| **400 uatm** | 1-3 (3)  31-34 (4)  61-63 (3) | 4-6 (3)  35-37 (3)  64-67 (4) | 7-10 (4)  38 -40(3)  68-70 (3) |
| **800 uatm** | 11-14 (4)  41-43 (3)  71-73 (3) | 15-17 (3)  44-47 (4)  74-76 (3) | 18-20 (3)  48-50 (3)  77-80 (4) |
| **1200 uatm** | 21-23 (3)  51-53 (3)  81-84 (4) | 24-27 (4)  54-56 (3)  85-87 (3) | 28-30 (3)  57-60 (4)  88-90 (3) |

28-30 (3); 57-60 (4); 88-90 (3)

Materials to prepare

* 90 labeled tubes for hemolymph