EXPLORING PRELIMINARY PROTEOMIC VARIATION FOR STRESS RESPONSE IN PACIFIC OYSTERS (*CRASSOSTREA GIGAS*)

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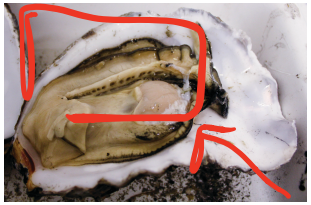
BACKGROUND



- *C. gigas* provides **ecosystem services**, **basis for aquaculture operations in Washington**[1]
- Susceptible to **ocean acidification** and **ocean warming**[2,3]
- Limited set of experiments examining **oysters' response to multiple stressors** that reflect wild conditions

OBJECTIVE: Understand how different environments and drive differential protein expression in response to stress

EXPERIMENTAL DESIGN

*Figure 1. Map of study sites in and around Puget Sound, WA. **Inset.** Oysters placed in both eelgrass and bare patches at each site to assess the impact of larger-scale ecological interactions on stress response.*

- **Five experimental sites**: Case Inlet, Fidalgo Bay, Port Gamble Bay, Skokomish River Delta, and Willapa Bay
- Outplanted **150 adult sibling *C. gigas*,** 30 per site
- Eelgrass presence: assess effect of **large-scale ecological interactions**
- **Continuous environmental chemistry monitoring**
- Gill tissue collected after one month for proteomic analyses

DATA-INDEPENDENT PROTEOMICS

OBJECTIVE: Match peptide spectra in ten oyster samples with stress-related proteins present in the *C. gigas* proteome[4,5]

(clockwise) Figure 2. Overrepresented gene ontology terms for stress-related proteins subsetted from all proteins found in C. gigas samples. Size of bubble is representative of frequency in data.

Figure 3. Coefficients of variation for stress-related proteins. Size of bubbles corresponds to coefficient value.

FINDING: Evidence for variation in stress response across five sites and eelgrass conditions

FUTURE DIRECTIONS

- Preliminary insight demonstrates how **stress-response is impacted by different environmental conditions**
- Use **data-specific peptide spectra**
- Repeat proteomic analyses with **increased sample size**
- Develop **targeted assay for stress-related proteins**

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3. Timmins-Schiffman et al. Shotgun proteomics reveals physiological response to ocean acidification in Crassostrea gigas. BMC Genomics 2014 15:951
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5. Timmins-Schiffman, Emma B., Grace A. Crandall, Brent Vadopalas, Michael E. Riffle, Brook L. Nunn, and Steven B. Roberts. 2016. "Integrating Discovery-Driven Proteomics and Selected Reaction Monitoring to Develop a Non-Invasive Assay for Geoduck Reproductive Maturation." bioRxiv. doi:10.1101/094615.