The Effects of Temperature and Ovarian Stage on Vitellin Concentrations in *Sicyonia ingentis*

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**Abstract:**
The ridgeback shrimp, *Sicyonia ingentis*, lives off the west coast of North America along the shorelines of California and Baja California, and is a source of revenue and food for residents of the area. The reproductive abilities of *S. ingentis* are crucial to the survival of the species. Vitellin (Vn) is an egg yolk protein found in the ovaries of reproductive shrimp and can also be seen in their hemolymph. This study examines temperature as a factor influencing the reproductive fitness of *S. ingentis*. The synthesis of Vitellin is a good indicator of reproductive activity and the concentrations of the Vn protein can be found using an ELISA (enzyme linked immuno-sorbant assay).

**Methods:**
- Two different tank environments
  - “Cold” tank at 11°C
  - “Warm” tank at 14°C
- Tagged shrimp and classified by ovarian stage
- Samples taken twice a week for two weeks
  - Each sample contains 50µl hemolymph
- Samples analyzed through ELISA Protocol

**Ecological Significance:**
The difference in temperature from the cold water tank environment (11°C) to the warm water tank environment (14°C) can simulate the effects if global warming continues to persist; showing the potentially harmful effects that this increase in temperature can have on marine species that are dependent on cold ocean temperatures for survival.

**ELISA Protocol:**
- Plates designed to bind proteins
  - Purified Vitellin added to a carbonate buffer
  - Blocking buffer added to block unnecessary binding sites.
- Competition reactions of Hemolymph samples and a primary antibody added next in addition to a standard curve
  - Secondary antibody added
  - ABTS provides a color change that will be read on an ELISA Plate Reader

**Results:**
With the established protocol, data can now be analyzed to learn the concentrations of the Vitellin protein in the different ovarian stages and temperature controls.

**Suggestions for Further Work:**
Further studies using temperatures as a variable could increase the difference in temperature between the two environments, or vary the temperature in a single tank environment as time progresses. Ocean water temperatures are variable and replicating these changes in a lab may give the best representation of their natural habitat.

**References:**

**Acknowledgements:**
I would like to thank Dr. Brian Tsukimura for allowing me to work in his lab, and gain this invaluable experience. I would also like to thank Alan Terusaki, Rob Delmanowski, and Anita Sarkar for all of their help in the lab this summer.

This material is based upon work supported by the Howard Hughes Medical Institute (HHMI). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of HHMI.

This work was administered by the Cal Poly Center for Excellence in Science and Mathematics Education (CESaME) and the Fresno State Science and Mathematics Education Center (SMEC) on behalf of the California State University.