



## Thermal stress in Larvae of the sand dollar (*Dendraster excentricus*) induces changes in hsp70 gen expression

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The relationship between temperature and individual performance is reasonably well understood, and much climate-related research has focused on potential shifts in distribution and abundance driven directly by temperature(1). It is known, that global climate change has profound implications for marine ecosystems and the economic and social systems that depend upon them. In virtually all organisms, including echinoderms, cells respond to a variety of stresses, as temperature changes, by the rapid synthesis of a highly conserved set of polypeptides termed heat shock proteins (HSPs) (2). Differential Hsp expression among species may allow functionally important genetic variation to cope with thermal stress and other environmental stressors, allowing populations to respond effectively to environmental change. The aim of the present work was to elucidate the effect of different temperatures on hsp70 expression in larvae of the sand dollar *Dendraster excentricus*. We are interested to understand what is how organisms that live in estuaries respond to global warming. We did thermo tolerance assays with 3 different larval stages of the sand dollar, including 8 arms plutei, competent and metamorphic larvae. We tested 4 experimental temperatures (4, 20, 26, and 29°C) and 3 different times (1, 3 and 6 hours). After each treatment, total RNA was extracted and used to quantify hsp70 expression levels using real time PCR analysis. We detected, after 6 hours of thermal stress, the highest over-expression levels of hsp70 in both metamorphic and competent larvae. In 8 arms pluteus larvae, no significant differences in hsp70 expression were observed after the exposure to the experimental temperatures. Taking together our results, indicate that larvae of *Dendraster excentricus* are responding according to their development stage to cope with thermal-stress. The capability of sand dollar larvae to acclimate and respond effectively to the climatic change would be determinated by the sea temperature where larvae development occurs. It seems that competent and metamorphic larvae are more sensitive to changes in sea water temperature, than 8 arms pluteus larval stage of *Dendraster excentricus*.

### References

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