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Impacts of ocean acidification on gene expression and biomineralisation in the Pacific oyster Crassostrea gigas Thunberg, 1793

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The published evidence of impacts of ocean acidification and on marine calcifiers has emphasized the need to understand the molecular mechanisms of biomineralisation. Crassostrea gigas is an ideal organism to examine these processes as: 1) the hatchery rearing of larval stages is well constrained, 2) studies have established an ontogenetic switch in deposition of carbonate polymorphs from aragonite in larval shells to calcite in adults and 3) it is a globally-important commercial species.
Research summarized in this presentation will identify some of the molecular mechanisms involved in calcification processes during ontogeny of Crassostrea gigas, as well as possible impacts of changes in environmental conditions such as temperature and pH. Data will be presented from a quantitative real-time PCR study of the changes in gene expression during development in different environments.
Additionally scanning electron microscopy and infrared spectroscopy analyses of shell microstructures and composition will be summarised to correlate changes in gene expression with end-point differences in shell structure.
Preliminary results suggest that changes in the environmental conditions lead to differences in expression patterns of genes involved in biomineralisation processes. The combined effects of ambient seawater temperature and low pH show the greatest negative effect on larval shell development, identified as malformations, eroded shell surfaces and a significant decrease in shell size. However, the effect of higher seawater temperature seems to amend the effects of ocean acidification on larval shell development.