

Biology Seminar

Biology Graduate Student Association and Department of Biological Sciences



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Molecular ecology of marine invertebrates: how early life history traits impact dispersal potential and tolerance to environmental change

The rapid pace of environmental change poses a variety of challenges to marine organisms spanning all levels of biological organization. Organismal responses to environmental changes include adaptation, acclimatization or dispersal to novel habitats. For many organisms living in oceans, dispersal only occurs during periods of early development and is driven by both physical oceanographic processes as well as biological traits. Therefore, persistence of marine organisms relies on the ability of early life-history stages to tolerate environmental variability and modulate their dispersal potential. One trait that impacts dispersal potential is the length of time in which larvae respond to environmental cues that trigger metamorphosis, or 'competence'. I describe gene expression patterns that characterize competence in a common species of tropical reef-building coral and test candidate pathways that might play a role in the development of this complex trait. In addition, it is estimated that phenotypic plasticity, and the molecular mechanisms associated with it, will be determinant factors on the capacity to respond to impending climatic oscillations. Marine organisms that naturally experience highly variable conditions, such as the purple sea urchin, likely have the capacity for high phenotypic plasticity. I investigate how environmental conditions of parent's impact phenotypes of their embryos and larvae by examining DNA methylation across the genome and how it might associate with phenotypes. This will reveal the capacity and potential mechanism for marine organisms to rapidly respond to change across generations. Taken together, a broad integrative approach to understanding organism-environment interactions from a population level to a molecular level will enable us to better predict the impact global change will have on marine organisms.

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