

title	The accumulation and effectiveness of natural sunscreens in purple sea urchins
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additional	
department	Biological Sciences
proj_desc	<p>The goal of this project is to examine how ultraviolet radiation (UVR) and algal diet effects accumulation of natural sunscreens, mycosporine-like amino acids (MAAs) in eggs and embryos of the purple sea urchin, <i>Strongylocentrotus purpuratus</i> and to determine whether MAAs provide protection against natural solar UVR.</p> <p>My laboratory has been investigating how marine organisms are affected by natural solar UVR using sea urchins as a model system. We investigate morphological and molecular responses to UVR. In addition, we have been investigating how sea urchins acquire MAAs from their algal diets. My previous students have identified MAAs in field-collected sea urchins and developed sensitive assays to quantify damage caused by UVR, so we can perform similar experiments comparing embryos with high or low levels of MAAs. The current experiments will allow us to feed sea urchins controlled diets of algae with or without MAAs with and without exposure to ultraviolet radiation at the Pier.</p> <p>We have recently initiated experiments feeding sea urchins diets with or without MAAs, knowing that sea urchins accumulate MAAs through their algal diets. We predict that the sea urchins being fed algae with MAAs will accumulate the sunscreens in their ovaries and eggs. In addition, we are exposing or protecting adult sea urchins to UVR simultaneously to determine how sea urchins will respond to exposure biochemically. We have four treatments (+MAA/+UVR, +MAA, -UVR, -MAA, +UVR, -MAA, -UVR). We will maintain these urchins on controlled diets until their spawning season and we will sample gonads every two months to quantify the concentration of MAAs accumulated using high performance liquid chromatography. During the spawning season and if we have eggs with varying amounts of MAAs, we can test whether MAAs provide protection against solar UVR in situ (in the water column).</p> <p>This study will allow us to better determine how quickly and how specifically MAAs are accumulated. In addition, it will provide us with a reliable source of eggs and sperm with high or low concentrations of MAAs to examine how MAAs protect molecular targets against UVR (a long range goal that we have not been able to address because of high levels of variation in MAA concentrations in sea urchins collected from the field). We will specifically use these sea urchins in the winter and spring to test effects of UVR on stress response of the sea urchin embryo proteome and DNA.</p>
inter_desc	This project will train students in the fields of marine ecology, environmental biology, developmental biology, biochemistry and biotechnology. In addition, it will involve public education. Student will be required to participate in our Pier Open House activities and share the details and results of their work with the public.
links	
students	1
majors	BIO
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