

<b>Project Id</b>	105
<b>Project Title</b>	Development and regeneration in colonial ascidians
<b>IName</b>	Keeling
<b>fName</b>	Elena
<b>Faculty Phone Number</b>	756-2175
<b>Faculty Email Address</b>	ekeeling@calpoly.edu
<b>Additional Faculty</b>	
<b>Faculty Department</b>	Biological Sciences
<b>Project Description</b>	<p>Colonial ascidians are marine invertebrates closely related to vertebrates; understanding the molecular and cellular processes underlying their biology can therefore shed light on how fundamental biological processes evolve. One interesting aspect of ascidian biology is their ability to undergo complete regeneration, forming an entire body from stem cells in the circulatory system. Greater understanding of the process of regeneration, the nature of the stem cells, and the molecules that regulate them in ascidians has the potential to provide insight that might eventually apply to successful regeneration of organs in humans. Honors research students last year began to investigate the expression of a protein that may help distinguish stem cells from other blood cells; we will continue analyzing ascidian blood cells and protein expression this year. In addition we will start molecular biology experiments to clone a gene potentially involved in stimulating regeneration.</p> <p>Another basic question in development and evolution is how body structures form and how genetic changes can result in new structures and life patterns. Colonial ascidians have an extended embryonic period and very short-lived larvae, which undergo a dramatic metamorphosis to produce the adult body. They also reproduce asexually by budding, as well as through fertilization of an egg by sperm. Adults have several organs similar to vertebrates, such as heart, stomach and intestine. Several projects are possible in this area including: examination of the process of metamorphosis in more detail; studies on the ascidian heart to explore comparisons with vertebrate hearts; analysis of the timing of expression of certain proteins for which the timing may differ from that seen in solitary ascidian species. I am also interested in characterizing the microbiological communities that live on colonial ascidians.</p>
<b>Interdisciplinary Nature Description</b>	This research incorporates developmental biology, cell biology, histology, molecular biology/biotechnology, and marine invertebrate zoology.
<b>Links</b>	
<b>Number of Honors Students Requested</b>	2
<b>Applicable Majors</b>	BIO, ASCI, BMED, MCRO, CHEM
<b>desired_res</b>	No specific skills are required, just excitement about biological research and the ability to work carefully in lab. Some laboratory coursework in biology, microbiology or biochemistry is desirable. Students with more specialized backgrounds (e.g. molecular biology or microbiology) will be able to pursue projects that utilize those skills.
<b>Date Added</b>	2008-10-18 13:45:53
<b>Active</b>	1