

**EXECUTIVE SUMMARY [NON-TECHNICAL ABSTRACT FOR PUBLIC INFORMATION OR PROGRAM PROMOTION]:**

State **in layman's terms** the application's broad, long-term objectives and specific aims, making reference to the potential public benefits of the project relevant to California.

Proteomics, the study of all the proteins within an organism, is a rapidly expanding, genome-enabled biotechnology that is being applied to a range of biological questions, most widely, to discover biomarkers for disease states. We are expanding the application of proteomics into the aquatic environment by studying the osmotic stress response of the only marine invertebrate whose genome has been sequenced (the sea squirt *Ciona intestinalis*) and whose proteins have been assigned to the genome sequence. We are studying how osmotic (hyposaline) stress of organisms in San Francisco Bay (and other Californian estuaries) that typically occurs during winter run-offs due to heavy rains may affect their sensitivity to such common pollutants as nitrate and nitrite. Since *Ciona* has a notochord and is therefore a close relative to other aquatic vertebrates, we will be able to assess the effects such combined stressors have on other chordates. The technologies we are pursuing with this grant will help us to improve the detection of proteins that signal stressful conditions in aquatic environments. Cal Poly State University is one of the leaders in applying proteomics to environmental problems state- and possibly nation-wide.