

NON -TECHNICAL ABSTRACT: *(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 for California.)*

Heat shock proteins (Hsps) are a group of proteins whose expression is increased when living cells are exposed to elevated temperatures or other stresses. Hsps are classified according to their molecular size and include the Hsp70 proteins, which are molecular chaperones essential for cell survival under both stress and normal conditions. Over- or under-production of Hsp70s has been correlated with many human pathological conditions like cardiopathies, cancer, and neurodegenerative diseases. Although their functions inside the cell have been extensively studied, their recently discovered functions at the cellular membrane and in the extracellular environment remain unidentified. It has been shown that membrane-bound or extracellularly localized Hsp70s are activating the immune system and are related to cancer, and several other diseases in humans. This project aims to characterize the newly described functions of Hsp70s by identifying how and where these proteins interact with cellular membranes. This study is the first step towards elucidating the physiological importance of the membrane-Hsp70 interactions, which are directly related to human health and disease. In addition to the relationships of the proposed research to human health, this project will train and educate undergraduate and graduate students in different scientific disciplines. Moreover, this project is designed to promote interdepartmental collaborations among California State University, Fullerton (CSUF) faculty with an interest in quantitative biology. These collaborations serve both the research and educational mission of the CSU system by enhancing research productivity and accelerating research discoveries, and by offering our students the chance to work in a multi-disciplinary team of scientists at the interface of molecular biology, biochemistry, molecular evolution, and bioinformatics.