

EXECUTIVE SUMMARY [NON-CONFIDENTIAL, 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. Do not include proprietary or confidential information. This may be distributed before the funding decision has been finalized.

Ergothioneine, an antioxidant compound that is present in human tissues and cells, is known to be synthesized in the bacterial pathogen *Mycobacterium tuberculosis*, the agent responsible for the disease tuberculosis. This disease kills more people in the world than any other disease except AIDS. The function of ergothioneine in *M. tuberculosis* is not known. If it has antioxidant functions in *M. tuberculosis* as it does in human tissues and cells, then ergothioneine may protect this bacteria against killing by the human immune system. The objective of this research project is to find mutants of *Mycoacterium smegmatis*, a harmless nonpathogenic cousin of *M. tuberculosis*, that do not have ergothioneine. By examining these mutants to see if they are impaired in growth under different stresses caused by oxidants, we can determine what the role of ergothioneine is in mycobacteria such as *M. smegmatis* and *M. tuberculosis*.