

**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.

The long-term goal of this research is to understand the link between manganese, free radical-related damage, and aging. The proposed research utilizes worms to investigate the importance of the manganese in the aging process. Free radicals are produced by normal cellular functions. When there are too many radicals in comparison to antioxidants, a shift in normal balance occurs causing "oxidative stress". This stress is implicated in many human diseases as well as aging. Our main focus is on manganese as there is accumulating evidence in bacteria and yeast suggesting that manganese may provide defense against radicals. However, the role of manganese is not clearly understood as it is also toxic in high doses. Work done in our laboratory uncovered that manganese supplementation can increase the average life-span of a short lived worm dying of radical related damage. Our current goal is to figure out how manganese is able to help the worms. Is it acting directly as an antioxidant, or indirectly by making more of other antioxidants that are present in the body? Data collected from this study will provide a strong basis for continuing work on manganese, oxidative stress, and aging in greater detail. The proposed research on understanding how ionic manganese can extend the average life-span is very important as the population of adults over the age of 65 in America is increasing. With increases in age, risk for late-onset diseases also increases. Uncovering how manganese works will be of vital importance in the pursuit for next generation drugs that will improve the quality of life in the aging population.