

**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.

Ultraviolet light, certain chemicals, and radioactive elements can damage individual DNA building blocks, and result in an increased risk of developing cancer. Control and repair proteins, found in all organisms, recognize and break down these damaged DNA building blocks. In this project, we will learn about the molecular details of a mechanism to safeguard genetic material through the study of a model control protein, TM0159 from the bacterium *Thermotoga maritima*. This protein is suggested to intercept damaged building blocks before they become incorporated into DNA. We will employ biochemical methods and macromolecular X-ray crystallography. The latter technique is used to obtain the 3 dimensional structure of the protein with bound DNA building blocks so that the positions of individual atoms can be located. The mechanism on how TM0159 differentiates between correct and incorrect DNA building blocks can thereby be studied on the molecular level. Fundamental knowledge of this kind might contribute to the development of novel cancer prevention strategies.