

**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. This research will determine the molecular mechanisms of why some proteins are present in one cell type, and not another, although the genes encoding these proteins are present in both cell types. We will use a bacterial model to address this question. Specifically, we will look at how genes are turned on or off and how proteins are destroyed once no longer needed. This research has several health implications relevant to the people of California. First, the proteins studied are required for cell division in many bacterial species, and therefore serve as potential targets for the development of antimicrobial compounds. Second, a better understanding of the bacterial cell cycle can give us a better understanding of cancer. The bacterial cell cycle has phases analogous to those of the human cell cycle. Since the bacteria have about 10% of the total number of proteins as human cells, we can more quickly develop biological models that can be applied to the human cell cycle.