ABSTRACT

CHARACTERIZATION OF DISULFIDE STRESS RESPONSE IN *MYCOBACTERIUM SMEGMATIS*

Mycobacterium tuberculosis (MTB), the causative agent of tuberculosis, persists in environments with elevated levels of reactive oxygen species that can damage bacterial cells. In this study, a 14,500-strain transposon mutant library was created in *Mycobacterium smegmatis*, the model organism for MTB, in order to determine genes involved in protection against diamide-induced disulfide stress, a subcategory of oxidative stress. Diamide oxidizes intracellular low-molecular-weight thiols to their disulfide form. Thus, sensitivity to diamide denotes sensitivity to disulfide stress. One hundred and one diamide-sensitive *M. smegmatis* mutants were identified. A set of largely constitutive cell processes such as protein, lipid, and nucleic acid metabolism, were affected by disulfide stress. Furthermore, assays with hydrogen peroxide, cumyl hydroperoxide, and plumbagin confirmed that the majority of diamide-sensitive mutants were also sensitive to other oxidants. This study is the first of this kind conducted in a prokaryote or archaea to understand the effect of disulfide stress.

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