ABSTRACT

GENE EXPRESSION OF MYCOBACTERIUM SMEGMATIS MC² 155 UNIVERSAL STRESS PROTEINS DURING STRESS

Universal stress proteins (Usps) are ubiquitous throughout archaea, bacteria, and eukarya; however their role in the cell is not well understood. Usps have been extensively studied in Escherichia coli, where they are upregulated after exposure to various stresses, indicating that they play a major role in stress protection. In mycobacteria, Usps have been shown to be upregulated by hypoxia and/or nitric oxide. To investigate their role in stress protection further, the expression of five mycobacterial usps was characterized by fusing the promoter region of the genes to green fluorescent protein and quantifying fluorescence after exposing Mycobacterium smegmatis to various stresses. Acidic, alkylating, DNA-damaging, heat, hypoxic, nitrosative, osmotic, and oxidative stress affected the expression of one or more usps, indicating that (1) Usps are involved in protection against these stresses and (2) Usps have overlapping and/or distinct roles against cellular stresses.

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