The σ^E Cell Envelope Stress Response of *Streptomyces coelicolor* is influenced by a Novel Lipoprotein, CseA

Matthew I. Hutchings,[1*] Hee-Jeon Hong,[1] Emmanuelle Leibovitz,[1] Iain C. Sutcliffe,[2] and Mark J. Buttner[1]

Abstract

Department of Molecular Microbiology, John Innes Centre, Norwich Research Park, Colney, Norwich NR4 7UH, United Kingdom,[1] Biomolecular and Biomedical Research Centre, School of Applied Science, Northumbria University, Newcastle upon Tyne NE1 8ST, United Kingdom[2]

Received 8 June 2006/ Accepted 1 August 2006

We have investigated the role of CseA in the σ^E cell envelope stress response of the gram-positive bacterium *Streptomyces coelicolor*. σ^E is an extracytoplasmic function RNA polymerase sigma factor required for normal cell envelope integrity in *S. coelicolor*. σ^E is encoded within a four-gene operon that also encodes CseA, a protein of unknown function, CseB, a response regulator and CseC, a transmembrane sensor histidine kinase (Cse represents *c*ontrol of *s*igma *E*). Previous work has shown that transcription of the *sigE* gene is completely dependent on the CseBC two-component system and that the CseBC-σ^E signal transduction system is induced by a wide variety of cell-wall-damaging agents. Here we address the role of CseA, a protein with no homologues outside the streptomycetes. We show that CseA is a novel lipoprotein localized to the extracytoplasmic face of the cell membrane and that loss of CseA results in upregulation of the *sigE* promoter.