The $\sigma^E$ 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. Buttner1

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 Kingdom2

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We have investigated the role of CseA in the $\sigma^E$ cell envelope stress response of the gram-positive bacterium *Streptomyces coelicolor*. $\sigma^E$ is an extracytoplasmic function RNA polymerase sigma factor required for normal cell envelope integrity in *S. coelicolor*. $\sigma^E$ 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 control of sigma $E$). Previous work has shown that transcription of the sigE gene is completely dependent on the CseBC two-component system and that the CseBC-$\sigma^E$ 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.