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# The $\sigma^E$ Cell Envelope Stress Response of *Streptomyces coelicolor* is influenced by a Novel Lipoprotein, CseA

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## Abstract

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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.