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<AT>The outer membrane protein OprF and the sigma factor SigX regulate antibiotic production in *Pseudomonas fluorescens* 2P24

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<ABS-HEAD>Abstract

<ABS-P>*Pseudomonas fluorescens* 2P24 produces 2,4-diacetylphloroglucinol (2,4-DAPG) as the major antibiotic compound that protects plants from soil-borne diseases. Expression of the 2,4-DAPG biosynthesis enzymes, which are encoded by the *phlACBD* locus, is under the control of a delicate regulatory network. In this study, we identified a novel role for the outer membrane protein gene *oprF*, in negatively regulating the 2,4-DAPG production by using random mini-Tn5 mutagentsis. A sigma factor gene *sigX* was located immediately upstream of the *oprF* gene and shown to be a positive regulator for *oprF* transcription and 2,4-DAPG production. Genetic analysis of an *oprF* and *sigX* double-mutant indicated that the 2,4-DAPG regulation by *oprF* was dependent on SigX. The *sigX* gene did not affect PhlA and PhlD expression, but positively regulated the level of malonyl-CoA, the substrate of 2,4-DAPG synthesis, by influencing the expression of acetyl-CoA carboxylases. Further investigations revealed that *sigX* transcription was induced under conditions of salt starvation or glycine addition. All these findings indicate that SigX is a novel regulator of substrate supplements for 2,4-DAPG production.

<KWD>Keywords: *Pseudomonas fluorescens*; 2,4-diacetylphloroglucinol; *sigX*; *oprF*; acetyl-coenzyme A carboxylase; outer membrane stress