

Influence of MarR Transcriptional Regulator on Competence in *Streptococcus mutans*

ANN M. SAGSTETTER

Objectives: *Streptococcus mutans* has highly-effective mechanisms to cope with adverse conditions in the oral cavity. Our laboratory has shown the *rcrRPQ* operon affects virulence properties, stress tolerance, and genetic competence in *S. mutans*. The RcrR gene product is a MarR-family transcriptional regulator that negatively regulates the expression of itself and *rcrPQ*, which encode ABC exporters. The purpose of this study was to understand the connection between RcrR and competence.

Methods: Expression of the *comX* and *comYA* genes was monitored, and transformation assays and growth studies were performed with *rcrR* mutant and complemented strains.

Results: A nonpolar *rcrR* mutant, which over-produced RcrPQ, exhibited enhanced resistance to competence stimulating peptide compared to the wild-type strain, but could not be transformed. A strain lacking the entire operon exhibited zero transformability despite expressing wild-type levels of *comX* and *comYA*. Introduction of *rcrR* into a non-polar *rcrR* mutant restored normal ABC exporter expression, transformation, and *comX* and *comYA* transcription. When *rcrR* was overexpressed in the wild-type strain, there was a decrease in *comYA* expression and transformation efficiency.

Conclusion: RcrRPQ play a major role in regulating competence via multiple routes, including modulation of *com* gene expression. Since optimal expression of RcrPQ is required for genetic transformation, the substrate for the transporters may govern competence and *com* gene expression by intra- and intercellular signaling. *This research was supported by a Student Summer Research Fellowship through T32DE07200 and by RO1DE13239.*