

Characterization of *plsX* mutant strain of *Streptococcus mutans*

Joel E. Diaz-Arana

Abstract

Streptococcus mutans, the major contributor to dental caries in humans, metabolizes dietary sugars to produce acid end products. The organism has developed adaptive mechanisms to survive the subsequent acidic environmental stress, including changes in membrane fatty acid composition. The *plsX* ortholog of *S. mutans*, encoded by SMu0022, has been shown in other organisms to be responsible for packing the fatty acids into the membrane. Here, we examine the contribution of *plsX* to the acid adaptive strategy of *S. mutans*. A deletion strain of SMu0022 (*plsX*) was created by ligation independent cloning (Lau, et al., 2002; Sheng, et al., 2010). The $\Delta plsX$ mutant strain (MU0022) was characterized for its acid and peroxide sensitivity in batch and in continuous cultures. The membrane fatty acid composition of this strain grown in biofilm cultures was determined by GC-FAME.

In batch cultures, the $\Delta plsX$ mutant strain was more resistant to acid than to peroxide. During steady-state growth at pH 5 in the chemostat, the $\Delta plsX$ mutant strain was resistant to acid and peroxide. When grown at a pH value of 7, the mutant strain was more resistant to peroxide stress.

Our results indicate that loss of *plsX* in *S. mutans* in biofilm cultures results in a more acid and peroxide resistant phenotype, as compared to the parent strain. We conclude that *PlsX* is involved in the acid adaptive response of *Streptococcus mutans*. It may reduce the pathogenicity of these bacteria during the adaptation process without affecting their overall virulence.