Outer membrane vesicle formation in *Porphyromonas gingivalis* with removal of relA and rshB genes
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**Abstract**

Biofilms are an essential component of many diseases, including periodontal disease. A major contributing pathogen to this disease is *Porphyromonas gingivalis*, which forms biofilms on the surfaces of the gums. There is currently limited information regarding the production of the stress signaling molecule, ppGpp, in *P. gingivalis* in its contribution to biofilm formation. To prevent the production of ppGpp, we aimed to delete the *relA* and *rshB* genes of *P. gingivalis* strain 33277 via using a suicide vector. Ligations were performed but were unsuccessful in multiple trials because very few colonies were formed. A total of six colonies were counted, which were used for PCR and in crystal violet assay to observe biofilm formation. Outer membrane vesicle formation was ultimately unsuccessful because there was no biofilm formation. Further study is required to determine the lack of biofilm.