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Constructing molecular mutants of *Porphyromonas gingivalis* to determine *relA* and *rshB* involvement in outer membrane vesicle formation

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*Porphyromonas gingivalis* is a Gram-negative bacterium that is one of the main culprits in periodontal disease. Its mechanisms of pathogenesis allow it to destroy tissues supporting teeth through chronic inflammation and travel to other areas of the body to influence the development of cardiovascular disease, dysbiosis in the large intestine, and kidney inflammation. Pathogenic bacteria like *P. gingivalis* typically experience certain environmental conditions such as low nutrient availability that induce cellular stress throughout the course of infection. Their ability to cope with this stress impacts their ability to survive within the host. Alarmone signaling serves as the trigger for cellular responses to stress like increasing the production of outer membrane vesicles (OMVs), a promoter of bacterial survival. Synthesis of the alarmone ppGpp, which may be involved in the increased rate of OMV production as OMVs are known to be correlated with alarmone signaling, has been identified to be the product of *relA* and *rshB* gene translation. To understand *relA* and *rshB*’s involvement in OMV production, two *P. gingivalis* mutants will be constructed using fusion PCR. *relA* will be deleted in one construct and *rshB* will be deleted in the other. The effects on OMV production will be determined after mutant cells are put under stress.