A Prevotella intermedia Genomic Library to Identify Hemolysin Genes

Skeete, Chelsey

Prevotella intermedia is an anaerobic pathogenic bacterium. It is known to cause infections of the mouth such as periodontitis disease and gingivitis. In addition, P. intermedia produces hemolysins, which are proteins that cause the lysis of red blood cells. This study shows that as the growth of P. intermedia declines, its hemolytic activity against red blood cells and cytotoxic activity against human T-cells increases. There appears to be a strong correlation between hemolysis and the bacteria's cytotoxicity against immune cells. Identification of the genes in P. intermedia's genome that express the most hemolytic phenotype provided more insights on how this bacterium is able to survive for long periods of time in dental patients and may lead to alternative treatment options. A constructed genomic library of P. intermedia was screened for genes with the most hemolytic activity. It was hypothesized that there will be various and unique hemolytic genes of multiple cytotoxic functions instead of the known 6 hemolysin homologs because the known hemolysin genes have not shown multiple cytotoxic functions in prior research. The results identified 18 genes that cause increased hemolytic activity. One clone in particular was aligned to a bacteriocin protein in the TonB system, which typically lyses other bacterial cells, but was shown to also lyse red blood cells in this project. Thus, the hypothesis was supported because other identified genes demonstrated a hemolytic phenotype that were not known as the 6 hemolysin homologs. The discovery of these genes can now lead to methods to suppress these genes and prevent damage in the oral pockets of dental patients.

Awards Won: