Effects of Grape Components on Periodontitis

Liang, Anne (School: duPont Manual High School)

Periodontitis is one of the most prevalent inflammatory diseases, with an annual expense of 14 billion dollars on the disease therapy. It is the leading cause of tooth loss among adults and is associated with various systemic diseases, including atherosclerosis, arthritis, and adverse pregnancy outcomes. Periodontitis is instigated by a number of microbial pathogens and is caused by the pathogen-induced inflammation and collateral tissue damages. Among all periodontitis pathogens, Porphyromonas gingivalis stands as a primary contributor to pathology and has been used in various animal models of periodontitis. P. gingivalis is able to signal through various immune receptors and signaling pathways for inflammation induction. The beneficial effects of grapes and grape products on human health have been widely investigated, and yet leave many questions unanswered. Reports have shown that grape components inhibit bacterial growth. Grape components, including (pro)anthocyanidins, catechins, flavonols, have been shown to down regulate inflammation. Therefore, it is highly plausible to ameliorate periodontitis by grape consumption through inhibiting oral pathogen growth and down-regulating the infection-induced inflammation and bone loss. Grape powder and grape powder extract, produced from fresh grapes, were tested for the effect of grape consumption on the prevention and amelioration of periodontitis. Through a series of in vitro and in vivo experiments, grape components were shown to inhibit oral bacterial growth, gingival inflammation, and alveolar bone loss in vivo, as well as osteoclastogenesis and pro-inflammatory cytokine production in vitro.

Awards Won:
Third Award of $1,000