Effect of Genistein in the growth of *Fusobacterium nucleatum*

Bryan Cruz  
Brigham Young University Hawaii  
Mentor Dr. Shane Gold

**Abstract**

*Fusobacterium nucleatum* is a early colonizing bacteria that adheres to teeth and gums and plays a direct role in the development of periodontal diseases. Genistein is an antimicrobial phytoestrogen produced by soybeans. This study investigated the antimicrobial effect of genistein on *F. nucleatum* and was found to inhibit grown *in vitro*, suggesting that consumption of soy products may be protective against periodontal disease.

**Introduction**

Gum infections are initiated by metabolic activities of early colonizing bacteria such as *Streptococcus mutans* an organism that hydrolyzes polysaccharides. *F. Nucleatum* then adhere to the biofilms firmed and promote colonization of more pathogenic strains. The metabolic activities of such communities produce irritants and acids that promote inflammation and create opportunities for further infections. Genistein is an antifungal compound found abundantly in soy (Martínez-Montemayor et al. 2010), and has been reported to reduce the risk of periodontal infections (Tanaka et al. 2008). However, there are no reports of an antimicrobial effect of it on *F. nucleatum*. The purpose of this study was to investigate the ability of genistein to inhibit the growth of *F. nucleatum*.

**Materials**

Genistein stock solutions were solubilized in DMSO to maximize concentration to a 100mM. Consequently, a two-fold dilution series was set up in tubes containing chopped meat broth to obtain concentrations ranging from 0.0012 mM to 0.61 mM. The tubes were inoculated at a 1% (w/v) inoculation level with an overnight culture of *F. nucleatum* (ATCC 25586); and incubated at 37°C under anaerobic conditions (Figure 2); whereupon, the absorbance was measured at 600 nm. Each assay was performed in duplicate.

**Results and Discussion**

Bacterial growth was observed at all genistein concentrations among the entire tested range but cell density exhibited a clear dose-dependent inhibitory effect (Figure 1). As *F. nucleatum* is an important early colonizer of the human oral cavity, the inhibition of this one species is key in preventing the development of periodontal disease. The results obtained herein suggest that the consumption of soy products, or the use of dental care products containing genistein, coupled with proper dental hygiene, may be able to help inhibit the growth of *F. nucleatum*, and thereby help prevent the development of gum diseases.

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**References**
