

NSU BIOL 4990A Independent study

Effect of *Porphyromonas gingivalis* derived
sphingolipids on osteoclastogenesis

Students: Michelle Hoang and Geena Song

Faculty Supervisor: Dr. Alexandru Movila

Overview

Winter 2020 semester (16 weeks)

Literary and Experimental Research at NSU
(Experimental was delayed due to Covid)

3 credit Independent Study Course counts for 1 ExEL credit

How did we get this opportunity?

Looked for dental research opportunity on NSU website

Emailed Jeff Hartman (jhartman2@nova.edu)

Directed me to Dr. Movila (my current independent study supervisor)

Emailed Dr. Movila my resume and wrote about my interest

Received a response to set up a meeting with him

What we did:

- ▶ Gathered peer-reviewed articles and papers to learn more about our topic
- ▶ We evaluated the several virulence factors of *P.gingivalis* then narrowed our research to the specific virulence factor our paper focused on (sphingolipids)
- ▶ Analyzed the impact of periodontitis on other systemic diseases

The Virulent Factors of *Porphyromonas Gingivalis* and their Contribution to the Onset of Systemic Diseases

Michelle Hoang and Geena Song

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Introduction:

Porphyromonas gingivalis (*P. gingivalis*), a gram-negative oral anaerobe, has shown to be highly involved in the pathogenesis of periodontitis [1]. Periodontitis, an inflammatory pathological damage of the gums and periodontal support tissues, can be initiated by the formation of biofilm plaques. A component of this biofilm that is highly correlated with chronic periodontitis is called the “red complex”, which consists of *P. gingivalis* (with *Tannerella forsythia* and *Treponema denticola*) [2]. The bacteria is asaccharolytic, meaning that it is incapable of breaking down carbohydrate for energy. It habits subgingival sulcus and relies on fermentation of amino acids or energy production [1]. Most importantly, *P. gingivalis* utilizes a panel of virulence factor to deregulate innate immune and inflammatory response, successfully colonizing the oral epithelium, inducing inflammatory response, and stimulating osteoclastogenesis. The importance of studying *P. gingivalis* has become significant due to the evident correlation between periodontitis and systemic disease, such as alzheimer's disease, down syndrome, and cardiovascular disease.



Our Experience

- ▶ Learned in depth about periodontitis and gum inflammation and was able to make connections while shadowing
- ▶ The signaling transduction of *P. gingivalis* was seen again while taking microbiology and cellular molecular biology

- GEENA

- ▶ After learning about the pathogenesis of periodontitis and its association with other systemic diseases, I realized the importance of educating others on the connection between oral and systemic health. Throughout this project, I learned how to effectively analyze sources and organize the material into a coherent narrative.

- MICHELLE



THE END