Genetic and Immunological Responses to Infection with Periodontal Pathogens in the Development of Atherosclerotic Vascular Disease in ApoE -/- Mice

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Periodontal Disease and Atherosclerotic Vascular Disease are the two most prevalent diseases both affecting nearly 200 million people globally. This research study helps us to understand the role of pro-atherosclerotic genes in plaque development, and how this can be diagnosed using Immunological, histological, and morphological analysis measures. In this study, first ApoE null mice subjects were infected with strains of P. gingivalis, T. denticola, T. forsythia, and F. nucleatum. At twelve and twenty-four week intervals. Samples of blood, mandible and maxilla, and genomic DNA from aortic tissues from ApoE -/- mice were provided to the student researcher for analysis of specific immune and inflammatory responses. Bacterial specific IgG antibody levels and IgM antibody levels were measured using a Serum ELISA (Enzyme-Linked Immunosorbent Assay) procedure. A histomorphometric analysis of aortic tissues was performed to understand the pathogenesis of plaque formation. The presence of the bacterial genomic DNA, or more specifically the pro-atherosclerotic genes, in the aorta and surrounding heart tissue, clearly indicate that P. gingivalis, T. denticola, T. forsythia, and F. nucleatum gained access to systemic circulation and to the aorta from gingival tissues and may have induced vascular wall lesions and promoted the formation of early atheromatous plaque in the aorta. This was mainly present in the monoinfection of T. denticola and P. gingivalis in ApoE -/- mice, detected by the presence of macrophages, T cells, Toll-like receptors 2 and 4, interleukin-6 (IL-6), and other pro-inflammatory factors in the ApoE -/- Mice. Morphometrical analysis was used to understand the effects of pathogens that lead to Periodontitis in the alveolar bone.

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