IADR INTERNATIONAL ASSOCIATION FOR DENTAL, ORAL, AND CRANIOFACIAL RESEARCH

FOR IMMEDIATE RELEASE
June 29, 2025

CONTACT:
Matt Niner
+1.703.299.8084
media@iadr.org

Periodontal Pathogen Aggregates Intestinal Inflammation and Glucose Metabolism

Alexandria, VA, USA – A study elucidating the impact of *Porphyromonas gingivalis* on gut microbiota composition and its contribution to intestinal inflammation was presented at the 103rd General Session of the IADR, which was held in conjunction with the IADR/Pan European Regional Congress on June 25-28, 2025 in Barcelona, Spain.

Periodontitis, a chronic inflammatory disease caused by dental biofilm, has been implicated in the exacerbation of systemic diseases including diabetes mellitus. However, the precise mechanisms linking periodontitis to hyperglycemia remain unclear. This study focused on alterations in the expression of inflammatory cytokines, tight junction proteins, and farnesoid X receptor (FXR) in diabetic db/db mice. Diabetic db/db mice were orally administered Pg or vehicle for 30 days. Gut microbiota diversity and composition were analyzed using metagenomic sequencing. Intestinal inflammation was assessed by measuring the gene expression of inflammatory cytokines (e.g., TNF-α, IL-6) and tight junction proteins (e.g., E-cadherin, occludin) in intestine using RT-PCR. FXR signaling and gluconeogenesis-related gene expressions in intestine and liver were also evaluated using RT-PCR.

Pg administration significantly altered gut microbiota composition, resulting in dysbiosis characterized by reduced bacterial diversity and a depletion of beneficial bacterial populations. The expression of inflammatory cytokines increased, and the expression of tight junction proteins decreased in intestine, indicating heightened intestinal inflammation. Furthermore, FXR expression was significantly reduced, contributing to the downregulation of FXR target genes in intestine and the upregulation of gluconeogenesis-related genes in the liver. These changes could exacerbate hyperglycemia in Pg-treated mice. This is the first study to establish a link between periodontal infection, gut dysbiosis, and glucose metabolism via intestinal inflammation and decreased FXR expression. Targeting the gut microbiota and FXR signaling pathways may provide promising therapeutic strategies for managing diabetes in patients with periodontitis.

The abstract, “Periodontal Pathogen Aggregates Intestinal Inflammation and Glucose Metabolism” was presented by Kosuke Maeda of the Osaka University, Japan during the "Advances in Host Response Mediators in Periodontal Environment II" Poster Session that took place on June 26, 2025 at 3:45 p.m. CEST (UTC+2).

About IADR

The International Association for Dental, Oral, and Craniofacial Research (IADR) is a nonprofit organization with a mission to drive dental, oral, and craniofacial research for health and well-being worldwide. IADR represents the individual scientists, clinician-scientists, dental professionals, and students based in academic, government, non-profit, and private-sector institutions who share our mission. Learn more at www.iadr.org.