

Increased levels of the T-helper 22-associated cytokine (interleukin-22) and transcription factor (aryl hydrocarbon receptor) in patients with periodontitis are associated with osteoclast resorptive activity and severity of the disease

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JOURNAL OF PERIODONTAL RESEARCH

Volume: 52

Issue: 5

Pages: 893-902

DOI: 10.1111/jre.12461

Published: OCT 2017

Document Type: Article

[View Journal Impact](#)

Abstract

Background and Objective Two new T-helper (Th) phenotypes have been recently described and named Th9 and Th22 lymphocytes; however, their role in the pathogenesis of periodontitis remains unclear. This study was aimed to assess whether Th9 and Th22 lymphocytes, through interleukin (IL)-9 and IL-22 production, respectively, are associated with the severity of periodontitis and bone resorption.

Material and Methods Gingival crevicular fluid samples and biopsies were obtained from patients with moderate-to-advanced chronic periodontitis and gingivitis, and healthy controls. The levels for the Th9 and Th22-associated cytokines and master-switch transcription factors Spi-B and aryl hydrocarbon receptor (AhR) were quantified by enzyme-linked immunosorbent assay, real-time reverse-transcription quantitative polymerase chain reaction and flow cytometry. In addition, the osteoclast activity in response to tissue homogenates from periodontitis and healthy samples was analyzed quantifying the number of TRAP-positive cells and areas of bone resorption pits produced, in the presence or absence of recombinant human IL-22 and anti-IL-22 neutralization antibody.

Results Higher levels of IL-22 and AhR were detected in patients with periodontitis compared with gingivitis and healthy individuals. In addition, higher levels of IL-9 and Spi-B were detected in gingivitis patients compared with periodontitis and healthy individuals. In patients with

periodontitis, a significant positive correlation was detected between secreted levels of IL-22 and clinical attachment level of the sampled periodontal pockets. When osteoclasts were exposed to tissue homogenates obtained from patients with periodontitis, higher levels of resorptive activity were observed as compared with the same cells exposed to tissue homogenates obtained from healthy individuals, and this increment was dependent on the presence and neutralization of IL-22.

Conclusion Increased levels of IL-22 produced by Th22 lymphocytes are associated with the pathogenesis of periodontitis, in particular, with osteoclast resorptive activity and severity of disease.

Keywords

Author Keywords: [AhR](#); [transcription factor aryl hydrocarbon receptor](#); [bone resorption](#); [interleukin-22](#); [periodontitis](#); [Th22 lymphocytes](#)

KeyWords Plus: [HUMAN GINGIVAL FIBROBLASTS](#); [GROWTH-FACTOR-BETA](#); [KAPPA-B LIGAND](#); [RHEUMATOID-ARTHRITIS](#); [OSTEOPROTEGERIN LIGAND](#); [PERIAPICAL LESIONS](#); [GENE-EXPRESSION](#); [POTENTIAL ROLE](#); [TH17 CELLS](#); [TH9 CELLS](#)

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Funding

Funding Agency	Grant Number
Comision Nacional de Investigacion Cientifica y Tecnologica	FONDECYT 1140904

[View funding text](#)

Publisher

WILEY, 111 RIVER ST, HOBOKEN 07030-5774, NJ USA

Journal Information

- **Impact Factor:** [Journal Citation Reports](#)

Categories / Classification

Research Areas:Dentistry, Oral Surgery & Medicine

Web of Science Categories:Dentistry, Oral Surgery & Medicine