

# Alveolar bone resorption and TH1/TH17-associated immune response triggered during *Aggregatibacter actinomycetemcomitans*-induced experimental periodontitis are serotype-dependent

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**Background:** *Aggregatibacter actinomycetemcomitans* expresses several virulence factors that may contribute to the pathogenesis of periodontitis. Based on the anti-genicity of the O-polysaccharide component of the lipopolysaccharide (LPS), different *A. actinomycetemcomitans* serotypes have been described. Among them, serotype b has demonstrated a stronger capacity to trigger Th1 and Th17-associated cytokine, CC-chemokine, and CC-chemokine receptor production on immune cells in vitro. With a murine model of experimental periodontitis, this investigation aimed to analyze the alveolar bone resorption and the pattern of immune response triggered by the different *A. actinomycetemcomitans* serotypes within periodontal lesions. **Methods:** For periodontal lesion induction, mice were orally infected with the different *A. actinomycetemcomitans* serotypes or their purified LPS. Alveolar bone resorption was analyzed using microcomputed tomography and scanning electron microscopy. Bacterial infection, receptor activator of nuclear factor-kappa B ligand (RANKL) and Th1 and Th17-associated cytokine, CC-chemokine, and CC-chemokine receptor levels were quantified by quantitative polymerase chain reaction (qPCR). T lymphocytes isolated

from periodontal lesions were analyzed by flow cytometry. Results: In periodontal lesions, serotype b of *A. actinomycetemcomitans* induced higher alveolar bone resorption and expression of RANKL compared with the other serotypes. In addition, serotype b induced greater levels of Th1- and Th17-related cytokines, CC-chemokines, and CC-chemokine receptors than the others. Similarly, higher numbers of infiltrating Th1 and Th17 lymphocytes were detected in serotype b-induced periodontal lesions. Conclusions: These results demonstrate that periodontal lesions induced with different *A. actinomycetemcomitans* serotypes elicited distinct alveolar bone resorption and immune response. In particular, serotype b was more pathogenic than the others and induced stronger Th1 and Th17 patterns of immune responses during experimental periodontitis. © 2018 American Academy of Periodontology.

*Aggregatibacter actinomycetemcomitans*

Bone resorption

Chemokine receptors

Chemokines

Cytokines

RANKL

T lymphocytes

*Aggregatibacter actinomycetemcomitans*

animal

micro-computed tomography

mouse

periodontitis

serotype

Th17 cell

*Aggregatibacter actinomycetemcomitans*

Animals

Mice

Periodontitis

Serogroup

Th17 Cells

X-Ray Microtomography