

Assessing the Impact of Resolvins on Bone Under Inflammatory Conditions: A Systematic Review

Maryam Baldawi and Chun-Teh Lee

Department of Periodontics and Dental Hygiene, UTHealth Houston School of Dentistry

Objective: Excessive inflammation is now widely recognized as a key process underlying the pathological feature for many diseases including cancer, arthritis, metabolic syndrome, chronic pain, periodontal, cardiovascular and neurological diseases, as well as bacterial and viral infections. Current data suggest that impact of certain resolvins and cytokines in inflammation inhibit bone loss, while other cytokines enhance bone loss in inflammatory conditions. In this review, the relationship between the mediators and osteoclasts and osteoblasts is examined in the context of inflammatory conditions.

Experimental Methods: A literature search was performed in the search engines PubMed, EMBED, and Cochrane to identify eligible studies, as shown in figure 1. The inclusion criteria for this review were as follows: (A) original research papers published in English; (B) papers focused on bone resorption caused by inflammatory bone disorders and bone preservation that was affected by resolvins, specifically RvE1 and RvD1. The exclusion criteria were as follows: (A) before January 2020; B) in vitro mice tissue samples; and C) studies with no control group. The search consisted of keywords “resolvin D1”, “resolvin D2”, “resolvin D3”, “resolvin D4”, “resolving D5”, “resolvin D6”, “resolvin E1”, “resolvin E2”, “resolvin E3”, “resolvin E4,” “bone” and “inflammatory.”. The primary outcome was the effect of resolvins on osteoclasts and bone volume.

Results: Once 38 records were screened, 16 studies were included. Qualitative evaluation demonstrated a positive trend between RvD1 and significant ($p < .05$) reduction in RANK expression which reduces osteoclastogenesis. Also, there is a significant ($p < .05$) trend between RvE1 and decrease in bone loss and number of osteoclasts based on in-vivo mice models.

Conclusion: In this review, the search revealed that resolvins directly acted on osteoclasts and osteoblasts to suppress bone resorption. Therefore, resolvins are a promising therapeutic agent for attenuating inflammation and preserving bone and provide hope for the inhibition of bone destruction induced by inflammatory bone disorders, such as rheumatoid arthritis and periodontitis, in patients.

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