Adipokine chemerin bridges dyslipidemia and bone remodeling

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Chemerin, a newly discovered adipokine, is secreted by adipocytes and is associated with obesity, insulin resistance, and metabolic syndrome. Elevated levels of chemerin have been found in obese and periodontitis patients, which were associated with periodontal tissue destruction. In this study, we aimed to evaluate the role of chemerin in osteoclasts differentiation and activation in vitro, and whether this adipokine could be involved in alveolar bone loss in dyslipidemic mice model. RANKL-induced osteoclasts gradually increased the expression of the chemerin receptor – CMKLR1. Chemerin did not modify RANKL-induced osteoclast markers gene expression such as NFATc1 and TRAP or multinuclear cell differentiation in vitro, but significantly increased osteoclasts actin ring formation and bone resorption activity in a dosedependent manner. More importantly, we showed that two models of dyslipidemic mice (HFD-treated mice and db/db mice) exhibited significantly increased serum level of cholesterol and chemerin. The expression of chemerin and its receptor were higher in the gingival tissue. Morphometric analysis showed that HFD-treated mice had an increased alveolar bone loss compared to the control. The increased bone loss in db/db mice was associated with up-regulated mRNA expression of chemerin, CMKLR1 and cathepsin K in the gingival tissue. Additionally, treatment with chemerin antagonist effectively inhibited bones loss in db/db mice. The blockage of chemerin receptor also inhibited the expression of cathepsin K in gingival tissue. Our results demonstrate that increased level of chemerin in dyslipidemic mice mediates the alveolar bone resorption by increasing cathepsin K and osteoclasts resorptive activity.