

عنوان مقاله:

Curcumin promotes osteogenic differentiation of periodontal ligament stem cells through the PI3K/AKT/Nrf2 signaling pathway

محل انتشار:

مجله علوم پایه پزشکی ایران، دوره 23، شماره 7 (سال: 1399)

تعداد صفحات اصل مقاله: 7

نویسندگان:

Yixuan Xiong - School of Stomatology, Shandong University, Jinan, China/Shandong Provincial Key Laboratory of Oral Tissue Regeneration, Jinan, China

Bin Zhao - School of Stomatology, Shandong University, Jinan, China/Shandong Provincial Key Laboratory of Oral Tissue Regeneration, Jinan, China

Wenjng Zhang - School of Stomatology, Shandong University, Jinan, China/Shandong Provincial Key Laboratory of Oral Tissue Regeneration, Jinan, China

Linglu Jia - School of Stomatology, Shandong University, Jinan, China/Shandong Provincial Key Laboratory of Oral Tissue Regeneration, Jinan, China

خلاصه مقاله:

Objective(s): The aim of this study was to investigate the effect of curcumin on the osteogenic differentiation of human periodontal ligament stem cells (hPDLSCs) and its underlying potential mechanism. **Materials and Methods:** The tissue explant adherence method was used to isolate hPDLSCs. Flowcytometry, Alizarin Red staining and Oil Red O staining were applied to confirm the stemness of the stem cells. CCK8 assays were used to evaluate the effect of curcumin at different concentrations on cytotoxicity, and alkaline phosphatase (ALP) activity assays, ALP staining and Alizarin Red staining were used to measure the osteogenic differentiation ability. In addition, hPDLSCs were treated with LY294002 (a phosphatidylinositol-3-kinase [PI3K] inhibitor) and erythroid transcription factor NF-E2 siRNA (siNrf2), respectively in the presence of curcumin. Western blotting was applied to evaluate the protein kinase B (AKT) phosphorylation levels and the Nrf2 levels. Besides, western blotting, RT-qPCR, ALP activity assays, ALP staining and Alizarin Red staining were used to detect the potential effects of curcumin on osteogenic differentiation. **Results:** Curcumin at an appropriate concentration had no cytotoxicity and could promote osteogenic differentiation of the hPDLSCs. The results of western blotting and RT-qPCR revealed that the protein and mRNA levels of ALP, COL1 and RUNX2 were increased by curcumin, while the PI3K/AKT/Nrf2 signaling pathway was activated. In addition, LY294002 was added to inhibit the PI3K/AKT signaling pathway, or siNrf2 was used to block the Nrf2 pathway; then, the stimulatory effects of curcumin on osteogenic differentiation were reversed. **Conclusion:** Curcumin could promote the osteogenesis of hPDLSCs, and the effect is related to the PI3K/AKT/Nrf2 signaling pathway.

کلمات کلیدی:

Akt, Curcumin, Nrf2, Osteogenic differentiation, Periodontal ligament, Stem cells

لینک ثابت مقاله در پایگاه سیویلیکا:

