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Flaxseed Ethanolic Extract Modulates B-Catenin and DKK1 Expressions During Osteoblast Differentiation of Dental Pulp-Derived Stem Cells

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Abstract	Background: WNT signaling regulates osteogenic differentiation of mesenchymal stem cells (MSC) through the canonical WNT pathway. beta-catenin; an important molecule of WNT pathway, and DKK1; a WNT antagonist, play important roles in regulating bone formation. Although flaxseed (<i>Linum usitatissimum</i>) has various health benefits, including promoting bone health, our previous study showed that flaxseed ethanolic extract (FEE) reduced the osteoblast differentiation potential of stem cells from human exfoliated deciduous teeth (SHED). This study aimed to determine the effects of FEE on WNT pathway-related molecules, beta-catenin and DKK1, during osteoblast differentiation of SHED. Methods: RNA at Day 7, 14, and 21 was extracted from SHED cultured in osteoblast induction media (OIM) treated with/without FEE and subjected to reverse transcriptase-PCR (RT-PCR) using the specific primers for B-Catenin and DKK1, while GAPDH acted as the internal control. Results: Treatment with FEE at 4 mg/ml significantly reduced beta-catenin and DKK1 expression at day 7 ($p < 0.01$), increased at day 14 ($p < 0.01$), and later was reduced at day 21 ($p < 0.01$). Conclusion: Overall, FEE modulates the expressions of WNT-associated molecules: beta-catenin and DKK1, during osteoblast differentiation of SHED, hence affecting the normal process of osteogenesis of SHED as demonstrated in the current analysis.		
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