

عنوان مقاله:

Effects of crocin on the enhancement of in vitro neurogenesis : Involvement of Notch and CREB/BDNF signaling pathways

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خلاصه مقاله:

Objective(s): Adult neurogenesis, the process of generating new neurons, continues throughout life. Unfortunately, this process is insufficient in pathological conditions and needs to be promoted. Crocin, the active component of saffron, affects neurogenesis in vivo and in vitro. We aimed to investigate the enhancing effects of crocin on the neurogenesis of adipose-derived mesenchymal stem cells in the presence of retinoic acid, as well as the molecular pathways involved. Materials and Methods: Differentiation capacities and stemness potential of harvested ADSCs were evaluated by differentiating into osteocytes and adipocytes, and expression of mesenchymal CD markers by flow cytometry. The optimum dose of crocin was assessed with an MTT assay. Crocin, retinoic acid, CREB/BDNF, and Notch inhibitors and their combination were added to the culture medium. Jag γ , Hes γ , Notch, and BDNF gene expression were analyzed by RT-PCR on days 7, 14, and 21, while CREB, DCX, SOX2, and NeuN expression were analyzed by immunofluorescence. Results: Expression of mesenchymal CD markers as well as adipogenic and osteogenic differentiation confirmed the origin and properties of ADSCs. The optimal dose of crocin was 1 mM. Crocin significantly ($P < 0.05$) increased, while inhibitors (DAPT&Naphthol) significantly ($P < 0.05$) decreased Jag γ , Hes γ , Notch, and BDNF expression. Immunofluorescent assessments showed that expression of DCX, BDNF, NeuN, and Sox2 proteins increased significantly ($P < 0.05$) after crocin administration and decreased significantly ($P < 0.05$) after inhibitor administration. Conclusion: Crocin can be used as an enhancer for neural differentiation of MSCs in vitro in the presence of retinoic acid. The mechanism is proposed through Notch and CREB/BDNF signaling pathways.

کلمات کلیدی:

ADSCs, CREB/BDNF, Crocin, Neurogenesis, NOTCH

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