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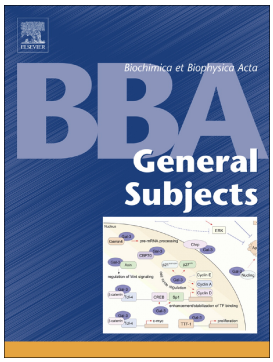

STAT-3 regulation of CXCR4 is necessary for the prenylflavonoid Icaritin to enhance mesenchymal stem cell proliferation, migration and osteogenic differentiation

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STAT-3 regulation of CXCR4 is necessary for the prenylflavonoid Icaritin to enhance mesenchymal stem cell proliferation, migration and osteogenic differentiation

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Abstract

Mesenchymal stem cell (MSC) dysfunction has been implicated in the pathogenesis of osteoporosis. MSCs derived from osteoporotic subjects demonstrate significant impairment in proliferation, adhesion and chemotaxis, and osteogenic differentiation, leading to reduced functional bone-forming osteoblasts and ultimately nett bone loss and osteoporosis. *Epimedium* herbs and its active compound Icaritin (ICT) have been used in Chinese ethnopharmacology for the treatment of metabolic bone diseases. Using an *in-vitro* cell culture model, we investigated the benefits of ICT treatment in enhancing MSC proliferation, migration and osteogenic differentiation, and provide novel data to describe its mechanism of action. ICT enhances MSC proliferation, chemotaxis to stromal cell-derived factor-1 (SDF-1) and osteogenic differentiation through the activation of signal transduction activator transcription factor 3 (STAT-3), with a consequential up-regulation in the expression and activity of cysteine (C)-X-C motif chemokine receptor 4 (CXCR4). These findings provide a strong basis for future clinical studies to confirm the therapeutic potential of ICT for the prevention and treatment of osteoporosis and fragility fractures.