

OPE9) Nanosphere Form of Curcumin Stimulates the Migration of Human Umbilical Cord Blood Derived Mesenchymal Stem Cells

Do-Wan Kim · Ju Ha Kim · Sei-Jung Lee

Department of Pharmaceutical Engineering, Daegu Haany University

Abstract

Curcumin, a hydrophobic polyphenol derived from turmeric, has been used a food additive and as a herbal medicine for the treatment of various diseases. In the present study, we found the functional role of a nanosphere loaded with curcumin (CN) in the promotion of the motility of human umbilical cord blood derived mesenchymal stem cells (hUCB-MSCs) during the wound closure. We found that the efficacy of hUCB-MSCs migration induced by CN was 1000-fold higher than that of curcumin powder. CN significantly increased the motility of hUCB-MSCs by activating c-Src, which is responsible for the phosphorylation of protein kinase C (PKC) and extracellular signal-regulated kinase (ERK). CN induced the expression levels of α -actinin-1, profilin-1 and filamentous-actin, as regulated by the phosphorylation of nuclear factor-kappa B during its promotion of cell migration. In a mouse skin excisional wound model, we found that transplantation of UCB-MSCs pre-treated with CN enhances wound closure, granulation, and re-epithelialization at mouse skin wound sites. These results indicate that CN is a functional agent that promotes the mobilization of UCB-MSCs for cutaneous wound repair.

Key words : Curcumin nanospheres, Motility, Wound repair