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A natural diarylheptanoid enhances mouse myoblast differentiation via estrogen receptor alpha and Akt, p38 MAPK signaling

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Diarylheptanoids is a phytoestrogen that exhibits numerous biological activities. However, its effect on myogenesis is not known. Previously, it has been shown that estrogen improved muscle regeneration after injury and that mouse myoblasts, C2C12, expressed estrogen receptors. This study, therefore, aims to determine the effect of 1-(4-hydroxyphenyl)-7-phenyl-(6E)-6-hepten-3-one, which is extracted from *Curcuma comosa* Roxb. and has an estrogenic activity comparable to that of genistein, on C2C12 cell differentiation. Using Western blotting and immunofluorescence staining, results showed that the compound increased the expressions of myogenin and Myosin Heavy Chain (MHC) proteins. These effects were blocked by ICI 182, 780 and siRNA for ER- α suggesting that ER- α is involved in the enhancement of myoblast differentiation. The compound also increased phosphorylation of ERK, Akt and p38MAPK. Interestingly, blockade of phospho-Akt and phospho-p38MAPK, but not phospho-ERK by their specific inhibitors abolished the enhancement of myogenin and MHC levels, indicating that Akt/p38MAPK pathway is associated with myoblast differentiation. In addition, ICI 182, 780 and 2-bromohexadecanoic acid, an inhibitor of palmitoyl-acyltransferase, prevented phosphorylation of Akt and p38MAPK. It is concluded that the diarylheptanoid extract enhances C2C12 myoblast differentiation by increasing MHC and myogenin levels through membrane ER- α mediated Akt and p38 MAPK signaling.

Biography

Chittipong Tipbunjong is a PhD candidate at the Department of Anatomy, Faculty of Science, Mahidol University. He receives a scholarship from the Office of the Higher Education Commission. At present, he is a Visiting Scholar, student at the Department of Physiology, College of Medicine and University of Kentucky.

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