

hESCs as well as study signaling molecules involved in stem cell niche.

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Effect of Flavonoid on in vitro Proliferation of Mouse Embryonic Stem Cells

Chang Hyun Lee^{1,2}, Eung-Ryoung Lee¹, Kilsoo Jeon^{1,2}, Geun Ho Gang¹,
Bong Woo Kim¹, Eun Young Kim², Sang-Goo Cho¹, Se Pill Park^{2,3}

¹Konkuk University, ²Mirae Biotech./Cheju National University Stem Cell Research Center,
³Cheju National University

Objectives: Embryonic stem cells are recognized as an excellent cell culture model for studying developmental mechanisms and their therapeutic modulations. Flavonoids are a diverse group of naturally occurring polyphenolic compounds with wide-ranging biological properties (e.g., antiviral, anti-inflammatory, mutagenic, antimutagenic, proliferative, and other effects). Thus, the aim of this work was to determine if flavonoid can promote mouse ES (mES) cell proliferation.

Methods: The D3 and G4-2 mES cells were plated in 24-well plates (1×10^4 cells/well) in the presence of various concentrations (0.5~200 μ M) of flavonoids (10 types), respectively. To examine the toxicity of flavonoid in the mES cell proliferation, we tried to test MTT assay. Flavonoid effect was examined during one day or three passages culture. The total cell number was measured with a hemocytometer. Using western blot analysis, Akt, Erk and STAT3 expression related to proliferation was checked.

Results: After one day treatment, in two types of treatment groups (3,2-dihydroxyflavone and 3,4-dihydroxyflavone), flavonoid effect for the mES cell proliferation was detected, while others were absolutely not. MTT assay showed the mES cell proliferation was increased about 1.5 folds at a concentration of 1 to 10 μ M in the two flavonoid treatment groups. The results were similar in both D3 and G4-2 mES cells. However, after treatment of the two flavonoids during three passages, we confirmed the proliferation effects on mES cells were slightly different, 3,2-dihydroxyflavone effect was continued in 5 μ M concentration but 3,4-dihydroxyflavone effect was in 1 μ M. The alteration of cell cycle in response to 3,4'-hydroxyflavonoid was examined. 3,4-dihydroxyflavone induced the phosphorylation of Akt, Erk and STAT3 in a dose dependent manner on western blot analysis. Also, 3,4'-dihydroxyflavone increased the levels of the cell cycle regulator proteins in a dose dependent manner.

Conclusion: In the present study, we concluded special types of flavonoids bring to positive effect on the D3 and G4-2 mES cell proliferation.