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Effect of Flavonoid on Mouse Embryonic Stem Cell Proliferation

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Objectives: Embryonic stem (ES) 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). 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.

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.

Conclusion: In the present study, we concluded special types of flavonoids bring to positive effect on the D3 and G4-2 mES cell proliferation. However, this effect has to be proved by short term and long term culture with other pluripotency examinations.