**Effects of Dimethyl Sulfoxide on Mouse Embryonic Stem Cell Pluripotency and Differentiation Capability**

Ke Huang[1]; Myoung Ok Kim[1]

1.Department of Animal Science and Biotechnology, Research Institute for Innovative Animal Science, Kyungpook National University, Sangju-si, Gyeongsangbuk-do, Republic of Korea

Mouse embryonic stem cells (mESCs) exhibit self-renewal in absence of the cytokine leukemia inhibitory factor (LIF). The growth media for mouse stem cells is supplemented with LIF, and its removal causes rapid differentiation. One of the most common solvents used in drug testing is dimethyl sulfoxide (DMSO). We treated 4-day mESC cultures to various doses of DMSO (0.1%, 0.5%, 1.0%, and 2.0%) in order to determine the safest dose while still being effective as a solvent. DMSO was used to treat mESCs cultivated in general pluripotency conditions in the absence of LIF. Furthermore, as a control for differentiation, mESCs were cultivated in the absence of LIF.DMSO increased the mRNA expression levels of pluripotency markers. Furthermore, DMSO decreased mRNA expression levels of ectodermal (β-tubulin3), mesodermal (Hand1), and endodermal (Foxa2 and Sox17) markers in mESCs. These findings suggest that DMSO treatment increases pluripotency while disrupting differentiation of mESCs. We also demonstrate that members of the Tet oncogene family play an important role in suppressing mESC differentiation and methylation. DMSO is appropriate for maintaining mESC pluripotency in the absence of LIF, and DMSO can keep mESCs undifferentiated. As a result, DMSO could serve as a partial replacement for LIF.