

PLURIPOTENT STEM CELLS INDUCING OSTEOCHONDRAL REPAIR

ABSTRACT

Multilineage-differentiating stress enduring (Muse) cells are stage-specific embryonic antigen-3 (SSEA-3) positive cells that exist in mesenchymal stem cell (MSC) populations. Muse cells have the pluripotency to differentiate into all germ layers as embryonic stem cells. The purpose of the present study is to investigate the efficacy of Muse cell transplantation for repairing osteochondral defects. Muse cells were isolated from human bone marrow MSCs. As osteochondral defects, the patellar grooves of immunodeficient rats were injured. Next, cells were injected into the mice so that the animals were divided into the following 3 groups: a control group to which PBS was injected; a non-Muse group to which 5×10^4 SSEA-3 negative non-Muse cells were injected; and a Muse group to which 5×10^4 SSEA-3 positive Muse cells were injected. In the Muse group, repaired tissues with almost smooth and homogenous surface were observed 12 weeks after the treatment, while no repaired tissue was found in the control and non-Muse groups. Histological evaluation indicates that the Muse group showed better repair in the osteochondral defect sites 4 and 12 weeks after the treatment, compared to the other groups. Thus, Muse cells are likely a novel promising cell source for treating osteochondral defects.

[FIG. 1]