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Effect of triiodothyronine on remyelination enhancement after mesenchymal stem cell intraperitoneal injection in C57bl/6 mice cuprizone model of multiple sclerosis

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Aim: Cell therapy for multiple sclerosis (MS) has become one of the newest therapies, even in its clinical phase. We used thyroid hormone subcutaneously to enhance effects of the transplanted stem cells for remyelination in corpus callosum.

Methods: First, human bone marrow mesenchymal stem cells (BM-MSCs) are cultured with α-MEM containing 10% fetal bovine serum (FBS). Demyelination model was induced in mice for 6 weeks by administration of the cuprizone, and in the fourth and fifth week after the first dose of cuprizone, the stem cells were administered intraperitoneally to the mice. From the fourth week to the end of the sixth week, the thyroid hormone was subcutaneously injected into the mice. At the end of the sixth week, the mice were killed and subjected to tissue evaluations using the luxol fast blue (LFB) staining technique for myelin pods also myelin basic protein (MBP) and platelet derived growth factor (PDGF)-α receptor immunohistochemistry. The expression of MBP, TR-β1, TR-β2 genes was investigated by realTime-PCR.

Results: In histology studies, demyelination has been induced by cuprizone, and this is clearly evident in the luxol fast blue staining and immunohistochemistry and molecular techniques. In the luxol fast blue and immunohistochemistry technique for MBP and PDGF-αR increased recovery in the combination group with the cell and the T3 hormone was seen compared to other groups. In the molecular studies, the combination group did significantly increase the expression of the MBP, TR-β1 and TR-β2 genes. However, TR-β2 gene played a more significant role.

Conclusion: In groups where we used combined cell and thyroid injection, we observed an increase in myelination compared to other groups that we used only from cells or hormone.

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