Treatment of Traumatic Brain Injury in Female Rats with Intravenous Administration of Bone Marrow Stromal Cells

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**Abstract**

OBJECTIVE: To study the effect of bone marrow stromal cells administered intravenously to female rats subjected to traumatic brain injury.

METHODS: We injected marrow stromal cells harvested from male rat bone marrow (n = 24) into the tail vein of the female rat (n = 8) 24 hours after traumatic brain injury; the rats were killed at Day 7 or 14 after treatment. The neurological function of the rats was evaluated using the rotarod test and the neurological severity score. The distribution of the male donor cells in brain, heart, lung, kidney, liver, muscle, spleen, and bone marrow of the female recipient rats was measured by identifying Y chromosome-positive cells using fluorescent in situ hybridization.

RESULTS: We found that marrow stromal cells injected intravenously significantly reduced motor and neurological deficits compared with control groups by Day 15 after traumatic brain injury (*P* < 0.05, analysis of covariance for repeated measures). The transplanted cells preferentially engrafted into the parenchyma of the injured brain and expressed the neuronal marker NeuN and the astrocytic marker glial fibrillary acidic protein. Marrow stromal cells were also found in other organs in female rats subjected to traumatic brain injury without any obvious adverse effects.

CONCLUSION: These data suggest that the intravenous administration of marrow stromal cells may be a promising therapeutic strategy that warrants further investigation for patients with traumatic brain injury.