

Neurobiological observations of bone mesenchymal stem cells in vitro and in vivo of injured sciatic nerve in rabbit.

ABSTRACT

The PKH26 is a fluorescent lipophilic dyes used for the study of Asymmetric cell Divisions (ASDs) and efficiently purifies the stem cell fraction. The aim of this study was to explore the neurobiological characteristics in vitro and in vivo and tracking fate of the transplanted rabbit Bone Marrow-Mesenchymal Stem Cells (rBM-MSCs). A fluorescent microscope was used to determine the changes in cell size, fluorescence intensity during tissue culture, track cell divisions and the distribution of PKH26 dye between daughter cells. The results showed the identification of ASDs based on fluorescence intensity of the PKH26 dye was distributed equally between daughter cells at each division in vitro. The labeling BMSCs with PKH26 showed within the wall of the neurons in the dorsal root ganglia in vivo. Labeled BMSCs which are fibroblastic-like cells in P4 showed oval shaped and less density than P2. Direct examine of the labeled BMSCs in the cryosections at 16 weeks post operation showed the BMSCs were differentiated and appeared as like Schwann cells in an anastomosed sciatic nerve in the Local Treated Group (LTG). In the Systemic Treated Group (STG) sections, the labeled BMSCs were migrated to the anastomosed sciatic nerve, ipsilateral lumbar dorsal root ganglia resembling glial and stellate cells and some of the labeled cells migrated to the anterior horn of spinal cord (motor neuron). In conclusion, the biological behaviors of BMSCs in vitro and in vivo showed highly mitosis at P2, activated fibroblast-like cells, differentiated to functional myelinating Schwann-like cells in LTG. The BMSCs in STG migrated and engrafted at the dorsal root ganglia as a neuron and glial cell, glial cells and satellite in the spinal cord.

Keyword: Rabbit mesenchymal stem cells; Intensity; MSCs; Neurobiology; PKH-26; Rabbit; Sciatic nerve.