

BSYJ Promoting Homing and Differentiation of Mesenchymal Stem Cells at the Retina of Age-Related Macular Degeneration Model Mice Induced by Sodium Iodate

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Abstract : Purpose: Age-related macular degeneration (AMD) is a major leading cause of visual impairment and blindness with no cure currently established. Cell replacement is discussed as a potential therapy for AMD. Besides intravitreal injection and subretinal injection, intravenous administration has been explored as an alternative route. This study is to observe the effect of BSYJ, a traditional Chinese medicine on the homing and differentiation of mesenchymal stem cells transplanted via tail vein injection in an age-related macular degeneration mouse model. Methods: Four-week-old C57BL/6J mice were injected with 40 mg/kg NaIO₃ to induce age-related macular degeneration model. At the second day after NaIO₃ injection, 1×10⁷ GFP labeled bone marrow-derived mesenchymal stem cells (GFP-MSCs) were transplanted via tali vein injection into the experimental mice. Then the mice were randomly divided into two groups, gavaged with either BSYJ solution (BSYJ group, n=12) or distilled water (DW group, n=12). 12 age-matched healthy C57BL/6J mice were fed regularly as normal control. At day 7, day 14, and day 28 after treatment, retina flat mounting was used to detect the homing of mesenchymal stem cells at the retina. Double-labeling immunofluorescence was used to determine the differentiation of mesenchymal stem cells. Results: At 7, 14, 28 days after treatment, the numbers of GFP-MSCs detected by retina flatmount were 10.2 ± 2.5, 14.5 ± 3.4 and 18.7 ± 5.8, respectively in the distilled water group, while 15.7 ± 3.8, 32.3 ± 3.5 and 77.3 ± 6.4 in BSYJ group, the differences between the two groups were significant (p < 0.05). At 28 days after treatment, it was shown by double staining immunofluorescence that there were more GFP positive cells in the retina of BSYJ group than that of the DW group, but none of the cells expressed RPE specific genes such as RPE65 and CRALBP, or photoreceptor genes such as recoverin and rhodopsin either in BSYJ group or DW group. However, GFAP positive cells were found among the cells labeled with GFP, and the double labeling cells were much more in the BSYJ group than the distilled water group. Conclusion: BSYJ could promote homing of mesenchymal stem cells at the retina of age-related macular degeneration model mice induced by NaIO₃, and the differentiation towards to glial cells. Acknowledgement: National Natural Foundation of China (No: 81473736, 81674033,81973912).

Keywords : BSYJ, differentiation, homing, mesenchymal stem cells

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