

Bone Marrow-Derived Cells are the Major Contributor of Kidney Fibrosis after Ureteral Obstruction

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Background: In kidney, fibrosis is a major of cause in chronic renal failure. It has been proposed that the fibrosis is associated with the transition of epithelial cell to mesenchymal cell, proliferation of pericytes and accumulation of inflammatory cells, resulting in increased accumulation of fibroblasts and extracellular matrix proteins. However, the origin of cells contributing to the fibrosis has not been defined yet. In the present study we investigate the role of bone marrow-derived cells in the fibrosis induced by ureteral obstruction in mice.

Methods: To track the bone marrow-derived cell, bone marrow cells which harvested from eGFP transgenic mice were transplanted into normal mice which are produced by same strain with eGFP mice, and then 8 weeks after bone marrow transplantation the chimeric mice were subjected to unilateral ureteral obstruction (UUO). 1, 3 and 12 days after UUO kidneys were harvested and used for further experiments including immunostaining using anti-GFP, -fibroblast specific protein-1 (FSP-1), -collagen III, and -proliferating cell nuclear antigen (PCNA).

Results: UUO resulted in gradual increases of GFP-positive cell number in the interstitium and expansion of interstitial area overtime. Over 80% of interstitial cell were GFP-positive at 12 days after UUO. Over 90% of GFP-positive cell in the interstitium were expressed FSP-1 protein at 12 days after UUO. Collagen III proteins were co-localized with GFP-positive cells. 49% and 55% of GFP positive cells were reacted with PCNA antibody 3 and 12 days after UUO, respectively, and some of GFP-positive cells were in mitosis. Cells presenting weaker GFP signal were expressed stronger FSP-1 and collagen III signal. It suggests that infiltrated cells into the injured kidney may differentiate into fibrogenic cells.

Conclusion: Bone marrow-derived cells play as the major contributor of kidney fibrosis after UUO via infiltration and accumulation into injured site, proliferation and differentiation into fibroblast cells.

Key Words: 콩팥 섬유화, 골수 유래 세포, 요관폐쇄

Kidney fibrosis, Bone marrow-derived cell, Ureteral obstruction