

A Novel Population of Mesenchymal Progenitors with Hematopoietic Potential Originated from CD14⁻ Peripheral Blood Mononuclear Cells

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Abstract :

Hematopoietic system derived progenitor cells with mesenchymal features have been identified including CD14⁺ monocyte-derived progenitors. However, it is unclear whether there are mesenchyme derived progenitors with hematopoietic potential. Herein, we identified a novel CD14⁻ cell-derived population with both mesenchymal and hematopoietic features in rat peripheral blood, and this cell population is different from the CD14⁺ monocyte-derived progenitors but designated peripheral blood multipotential mesenchymal progenitors (PBMMPs). Phenotype analysis demonstrated expression of mesenchymal markers in PBMMPs including BMPRs, Endoglin/CD105, Fibronectin (Fn), Vimentin (Vim), Collagen (Col) I/II/III along with hematopoietic marker CD34. CD14⁺ cell-derived population shared the same characteristics with CFs. In mixed culture of CD14⁺ and CD14⁻ cells, PBMMPs were a predominant component and expressed CD29^{high}, CD73^{high}, CD34^{high}, CD45^{low} and CD90. Except for the value of mixed T lymphocytes and CD14⁺ cell-derived population, hematopoietic characters of cultured PBMMPs were indicated by CD14⁻/CD34⁺/CD45⁻/CD90⁺. The mesenchymal origin was further confirmed by comparing PBMMPs with bone marrow stromal cells. Finally, we transplanted PBMMPs into a skin wound model, and results showed the specific potential of PBMMPs in not only extracellular matrix secretion but epidermal regeneration. This study provides evidence that peripheral blood contains common hematopoietic-mesenchymal progenitors from both hematopoietic and mesenchymal lineages, and CD34⁺ mesenchymal progenitors are a possible alternative source of epidermal cells in wound healing.

Key Word :

Peripheral blood stem cells, Mesenchymal stem cells, Hematopoietic stem cells, Stem cell plasticity, Common progenitor, Wound healing

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