

Mesenchymal Stem Cell-Derived Exosomes Improve the Microenvironment of Infarcted Myocardium Contributing to Angiogenesis and Anti-Inflammation

Rat Spleen Cells

CASE STUDY

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Introduction

Bone marrow mesenchymal stem cells (MSCs) are widely used for treating myocardial infarction. However, due to the inflammatory and ischemia microenvironment of acute myocardial infarction, MSCs face survival challenges. It remains unclear how MSC-derived exosomes play a role in improving this microenvironment. The paracrine effects of exosomes on angiogenesis and anti-inflammatory activity were examined by treating cells with MSC-derived exosomes. Viable and active rat spleen lymphocytes were isolated using MP Bio's Lymphocyte Separation Media (LSM) for subsequent labeling and treatment with MSC-derived exosomes to demonstrate an overall inhibition of lymphocyte proliferation.

Overview

- **Keyword:** MSC, Exosome, Microenvironment, Angiogenesis, Myocardial infarction
- **Aim of the study:** To investigate the paracrine effects of mesenchymal stem cell-derived exosomes on angiogenesis and anti-inflammatory activity associated with acute myocardial infarction.
- **Application:** Flow cytometry
- **Sample name:** Rat spleen cells
- **Material:** Lymphocyte Separation Medium (LSM™, SKU 0850494) from MP Bio

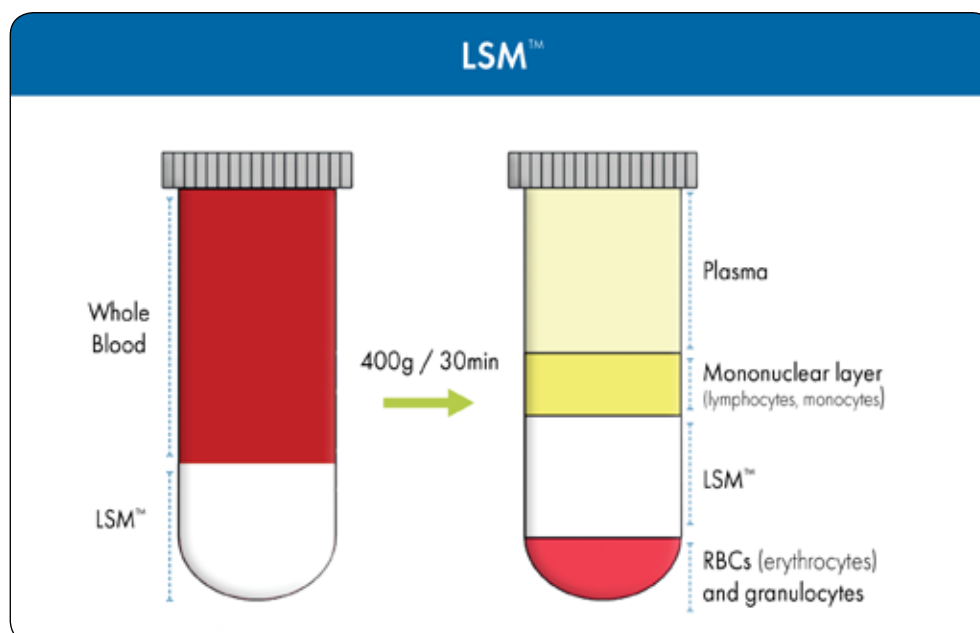


Figure 1.

Isolation of mononuclear cells from whole blood using LSM™ density separation medium.

CASE STUDY

Protocol and Parameters

1. Collect spleen lymphocytes from healthy SD rats using Lymphocyte Separation Medium (LSM™).
2. Wash cells with RPMI.
3. Label cells with 10 μ M carboxyfluorescein diacetate succinimidyl ester.
4. Seed the CFSE-labeled cells in DC3-coated 96-well plates and treat with 10 μ g/ml MSC-derived exosomes.
5. Culture the cells for 5 days.
6. Harvest spleen lymphocytes and detect by fluorescence-activated cell sorting.

Conclusion

- Despite having a slightly higher average density than humans, LSM was successfully used to isolate lymphocytes from rodent spleen.
- The authors demonstrated that exosomes are the active ingredient of paracrine secretion by mesenchymal stem cells (MSCs). MSC-derived exosomes stimulate neovascularization and restrain the inflammation response.

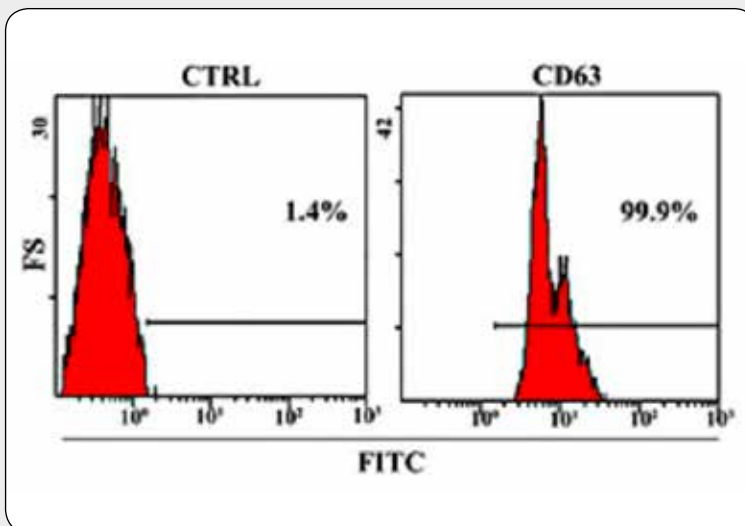


Figure 2.

Flow cytometric analysis of exosomes secreted by MSCs. Left panel: control (anti-CD63 antibody; no exosomes); right panel: exosomes with FITC-conjugated anti-CD63.

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