THE JOURNAL OF
Obstetrics and Gynaecology Research

doi:10.1111/j.1447-0756.2011.01800.x J. Obstet. Gynaecol. Res. Vol. 38, No. 5: 804–809, May 2012

Effect of menstrual blood-derived stromal stem cells on proliferative capacity of peripheral blood mononuclear cells in allogeneic mixed lymphocyte reaction

Shohreh Nikoo[1], Massoumeh Ebtekar[1], Mahmood Jeddi-Tehrani[2], Adel Shervin[3], Mahmood Bozorgmehr[1], Somaieh Kazemnejad[3] and Amir Hassan Zarnani[4,5]

[1]*Department of Immunology, Faculty of Medical Sciences, Tarbiat Modares University,* [2]*Monoclonal Antibody Research Center,* [3]*Reproductive Biotechnology Research Center and* [4]*Nanobiotechnology Research Center, Avicenna Research Institute, ACECR and* [5]*Immunology Research Center, Tehran University of Medical Sciences, Tehran, Iran*

Abstract

Aim: Menstrual blood stromal stem cells (MBSCs) have been demonstrated to exhibit stem cell properties such as the capability for self-renewal and multipotency, allowing for multilineage differentiation. In addition, this cell type has various immunomodulatory effects. In this study, we examined the potential effect of MBSCs on proliferation of peripheral blood mononuclear cells (PBMCs) in allogeneic mixed lymphocyte reaction (MLR).

Materials and Methods: Menstrual blood was collected from healthy donors after menstrual blood flow initiated and its mononuclear cell fraction was separated. Cells were subsequently cultured and adherent cells were allowed to propagate and used as stem cells. Flowcytometric immunophenotyping was performed using a panel of monoclonal antibodies including CD44, CD45, CD34, CD9, CD29, CD10, CD38, CD105, CD73, CD133, STRO-1 and Oct-4A. For functional analysis, PBMCs were co-cultured with MBSCs, collected after 4 days and added to allogeneic PBMCs. 2,3-Bis-(2-methoxy-4-nitro-5-sulfophenyl)-2H-tetrazolium-5-carboxanilide (XTT) assay was carried out to evaluate cell proliferation.

Results: MBSCs showed surface and intracellular markers of mesenchymal stem cells with the exception of the high expression of Oct-4A. MBSCs affected the proliferative response of PBMC in a dose-dependent manner. At ratio of 1:1 to 1:2, MBSCs inhibited, while at lower ratios (1:32 to 1:64) stimulated the proliferative capacity of allogeneic PBMCs.

Conclusion: According to the present study, MBSCs exert their immunoregulatory effects on allogeneic PBMCs in a dose-dependent manner. This finding can be considered as a valuable point in future cell therapy strategies, when this cell population is used.

Key words: allogeneic mixed lymphocyte reaction, menstrual blood, proliferation, regulatory T cells, stromal stem cells.

Introduction

Stem cells are self-renewing cells with the potential ability of differentiating into various specialized cell types under specific conditions. Adult stem cells are derived from different sources, such as bone marrow,[1] cord blood,[2] adipose tissue[3] or amniotic fluid[4] and have been shown to possess regenerative potential in a

Received: May 11 2011.
Accepted: October 9 2011.
Reprint request to: Dr Masoumeh Ebtekar, Department of Immunology, Faculty of Medical Sciences, Tarbiat Modares University, Jallal-Al-Ahmad Highway, Nasr Bridge, Tehran 1411713116, Iran. Email: ebtekarm@modares.ac.ir
Co-corresponding author: Dr Amir Hassan Zarnani, Nanobiotechnology Research Center, Avicenna Research Institute, ACECR, Shahid Beheshti University, Evin, Tehran 1936773493, Tehran, Iran. Email: zarnani@avicenna.ac.ir