

## ESTABLISHMENT AND EVALUATION OF THE SUSPENSION CULTURE SYSTEM FOR UMBILICAL CORD-DERIVED MESENCHYMAL STROMAL CELLS

Hikari Hasegawa, ROHTO Pharmaceutical Co.,Ltd.  
hasegawah@rohto.co.jp  
Atsuko Takahashi, The University of Tokyo  
Takashi Takijiri, ROHTO Pharmaceutical Co.,Ltd.  
Akiko Hori, The University of Tokyo  
Tetsuo Furuno, ROHTO Pharmaceutical Co.,Ltd.  
Eiichi Koga, MICRONIX Co.,Ltd  
Tetsuo Koike, ROHTO Pharmaceutical Co.,Ltd.  
Tokiko Nagamura-Inoue, The University of Tokyo  
Masayo Yumoto, ROHTO Pharmaceutical Co.,Ltd.

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Mesenchymal stromal cells (MSCs) derived from various tissues including bone marrow, adipose and umbilical cord tissues have been shown to modulate aberrantly activated immune system. With the features, MSC-based therapies targeting graft-versus-host disease (GvHD) by the administration of bone marrow-derived MSCs (BM-MSCs) have been available in some countries including Japan, and the expectations for the stable and cost effective supply system are getting higher and higher recently. However, the conventional culture systems which usually use plastic flask or multi-chamber equipment require space and manpower, thus the maximal expansion of MSCs at one production is likely to be limited. To compensate the limitation, repetitive productions have been unavoidable, and higher the production cost.

Here, we introduced a new suspension-culture system, using micro-carriers and single-use-bioreactors, for the preparation of MSCs in anticipation of establishment of mass production system. Since the umbilical cord (UC) tissues can be collected through noninvasive procedure, and UC-derived MSCs (UC-MSCs) are shown to present higher proliferation rate and lower immunogenicity in comparison with BM-MSCs, we evaluated the potential and the versatility of UC-MSCs for the treatment of several diseases including GvHD. Results from several in vitro assays demonstrated that our new culture system maintains major key characteristics of MSCs, such as adhesiveness to cell culture surface, the expression of cell surface markers, differentiation capacities toward osteoblasts, chondroblasts, and adipocytes, and immunosuppressive effects on activated T cells. We are currently investigating cellular profiles and characteristics which are specific to the cells prepared in our suspension-culture system through meta-analysis. The established suspension-culture system is presumed to attain the mass production of UC-MSCs, contributing to lower the cost and also providing possible applications for MSCs from other origins.