

Generation and characterisation of human umbilical cord derived mesenchymal stem cells by explant method

ABSTRACT

Mesenchymal stem cells (MSCs) derived from human umbilical cord (UC) have been considered as an important tool for treating various malignancies, tissue repair and organ regeneration. Umbilical cord-derived mesenchymal stem cells (UC-MSCs) are better alternative to MSCs that derived from bone marrow (BM-MSCs) as they are regarded as medical waste with little ethical concern for research and easily culture-expanded. In this present study, the foetal distal end of human UC was utilised to generate MSC by explant method. Upon in vitro culture, adherent cells with fibroblastic morphology were generated with rapid growth kinetics. Under the respective inductive conditions, these cells were capable of differentiating into adipocytes and osteocytes; express an array of standard MSC surface markers CD29, CD73, CD90, CD106 and MHC-class I. Further assessment of immunosuppression activity revealed that MSCs generated from UC had profoundly inhibited the proliferation of mitogen-activated T lymphocytes in a dose-dependent manner. The current laboratory findings have reinforced the application of explant method to generate UCMSCs thus, exploring an ideal platform to fulfil the increasing demand of MSCs for research and potential clinical use.

Keyword: Explant method; Human umbilical cord; Immunophenotyping; Immunosuppression; Mesenchymal stem cell