## ABSTRACT

Bone marrow-derived mesenchymal stem cells (BM-MSCs) are currently being investigated in preclinical and clinical settings because of their self-renewal and multilineage differentiation capacity. BM-MSCs also have an ability to promote hematopoietic stem cell engraftment and prevent graft versus host disease (GvHD) in patients who receive allogeneic stem cell transplantation. However, collecting BM-MSCs requires highly invasive procedure and there is a report indicating that the number of BM-MSC might decline with age. Therefore, MSCs derived from other sources have been considered as an alternative. MSCs derived from post-natal tissues are suitable substitutes for BM-MSCs because of the immaturity of newborn cells. In this study, we successfully isolated MSCs from umbilical cord, Wharton's jelly, placenta and amnion by mechanical separation and subsequent enzymatic digestion. These MSCs exhibited plastic adherence property and fibroblast-like morphology in consistent with those of BM-MSCs. After culture, BM-MNCs can generate MSC-like colonies within 8.2±0.75 days while it took 7.6±0.88, 9.8±0.75, 18.6±1.05, 11.8±1.19, days for UC-MSCs, WJ-MSCs, PL-MSCs and AM-MSCs, respectively, to generate MSC-like colonies. UC-MSCs and WJ-MSCs had significantly higher proliferative capacity than BM-MSCs. In contrast, PL-MSCs and AM-MSCs had significantly lower proliferative capacity than BM-MSCs. After culture for three passages, more than 70% of BM-MSCs, UC-MSCs, WJ-MSCs, AM-MSCs and PL-MSCs were homogeneously expressed CD73, CD90 and CD105. In contrast, the expression of CD45 and CD34 (markers of hematopoietic cells) in those populations is negative. In addition, UC-MSCs, WJ-MSCs, AM-MSCs and PL-MSCs also have an ability to differentiate toward osteocyte and adipocyte-lineages in a manner similar to those of BM-MSCs. Furthermore, UC-MSCs, WJ-MSCs, PL-MSCs, AM-MSCs expanded *in vitro* can inhibit the proliferation of alloreactive T-lymphocyte in mixed lymphocyte reactions (MLR) assays. Based on these findings we conclude that MSCs from post-natal sources have the same properties as BM-MSCs and might be used as an alternative source of MSCs for future clinical applications.