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EXPIRED PLATELET CONCENTRATES AS A SOURCE OF HUMAN PLATELET LYSATE FOR THE CULTURE OF MESENCHYMAL STEM CELLS

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SUMMARY

Nowadays, human platelet lysate (hPL) has been widely used for the mass expansion of stem cells within the current Good Manufacturing Practice (cGMP) accredited facility for clinical applications. To avoid the competition with blood bank for the potentially lifesaving donor bloods, we collected the expired platelet concentrates from the blood bank to prepare the hPL. In this study, we determined the feasibility of using hPL prepared from expired platelet concentrates for *in vitro* expansion of Wharton's jelly-derived mesenchymal stem cells (WJ-MSCs). We isolated the WJ-MSCs from umbilical cord and cultured the cells with 10% hPL and 10% fetal bovine serum (FBS) until P5. The cell seeding density was 5000 cells/cm² from P1 to P5. The cells were trypsinized once they reached 90% confluence and the cell yield, viability and population doubling time were examined. Results showed that more cells were obtained in the hPL group at all passages with significant differences detected at P1 to P5 compared to the FBS group. Population doubling time was significantly shorter in the hPL group compared to the FBS group at all passages. Viability of WJ-MSCs was not affected by the serum substitute used as both groups demonstrated viability above 95% for all passages. More WJ-MSCs were harvested in the hPL group probably due to the changes in the cell morphology as WJ-MSCs cultured with hPL were slender and smaller in size. As a summary, hPL prepared from expired platelet concentrates appears to be a better serum supplement for the culture of WJ-MSCs compared to the FBS as indicated by the higher cell growth. Thus, hPL prepared from expired platelet concentrates has the potential to be used in cGMP facility for the mass production of WJ-MSCs. However, more studies need to be performed in the future to examine the characteristics and functionalities of WJ-MSCs cultured with hPL to prove that the cells are safe and effective to be used clinically.

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