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COMPARISON OF HUMAN AMNIOTIC FLUID-DERIVED AND UMBILICAL CORD WHARTON'S JELLY-DERIVED MESENCHYMAL STROMAL CELLS: CHARACTERISATION AND MYOCARDIAL DIFFERENTIATION CAPACITY

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Objectives To compare the characterisation and myocardial differentiation capacity of amniotic fluid-derived mesenchymal stromal cells (AF MSCs) and umbilical cord Wharton's Jelly-derived mesenchymal stromal cells (WJ MSCs).

Methods The human AF MSCs were cultured from amniotic fluid samples obtained by amniocentesis. The umbilical cord WJ MSCs were obtained from Wharton's Jelly of umbilical cord which were obtained from the infants delivered full-term by normal labour. The morphology, growth curves, cells surface markers analysis by flow cytometry were compared between the two types of cells.

Myocardial genes (GATA-4, cTnT, α-actin, and Cx43) were detected by Real-time PCR and the corresponding protein expression were detected by western blot analysis after myocardial induced in AF MSCs and WJ MSCs.

Results Our findings revealed that AF MSCs and WJ MSCs shared similar morphological characteristics of fibroblastic shapes. The AF MSCs were easier obtained than the WJ MSCs and had a shorter time to reach adherence of 2.7±1.6 days to WJ MSCs of 6.5 ±1.8 days. The growth curves by MTT cytotoxic assay showed that the AF MSCs had a similar proliferative capacity at passage 5 and passage 10. However the WJ MSCs' proliferative capacity were relatively decrease at 10 passage than 5 passage. Both AF stem cells and WJ stem cells had the characteristics of mesenchymal stromal cells and some characteristics of embryonic stem cells through surface marker identification by flow cytometric analysis. They express CD29 and CD105, not express CD34. They were positive for Class I major histomocompatibility (MHC I) antigens (HLA-ABC), and were negative or mildly positive for MHC Class II (HLA-DR) antigen. Oct-4 were positive in two cells types. Both AF MSCs and WJ MSCs could differentiate along myocardium. The differentiation capacity were detected of the GATA-4, cTnT, α-actin, Cx43 mRNA and protein expression after myocardial induction.

Conclusions The AF MSCs and WJ MSCs both have the potential clinical application for myogenesis in cardiac regenerative therapy.