Biomedical Research & Therapy

ISSN: 2198-4093
www.bmrat.org

POSTER

Characterisation, proliferation and differentiation potential of long term cultured Wharton's Jelly derived mesenchymal stem cells

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Abstract

Background: Mesenchymal stem cells (MSCs) have a promising role in regenerative medicine with their self-renewal and multilineage differentiation abilities. However, cell expansion is essential before their application and reports have showed that long term culture of MSCs can alter their stem cell characteristics. Wharton's jelly derived MSCs (WJ-MSCs) as favorable source of MSCs need to be examined in long term culture before used in clinical settings. In this study, WJ-MSCs were isolated via enzymatic digestion using collagenase type 1. Cells at P5, P10 and P15 were observed for their morphology and growth kinetics where the findings showed that the extensive culture of WJ-MSCs can reach an average of 40 population doubling time with slight changes in their fibroblast-like morphology. The analysis of clonogenic activity showed no significant difference in WJ-MSCs' ability in forming colony at early passage and later passage. Oil Red O and Von Kossa staining results for in vitro differentiation assays of WJ-MSCs into adipocytes and osteocytes showed WJ-MSCs were easily differentiated at P5 compared to P15. The reduction in both proliferation and differentiation potentials of WJ-MSCs were observed at later passages (P15). These suggested that as the passage numbers increases cells loss the ability in maintaining their plasticity. In conclusion, long term culture of WJ-MSCs can impair their stem cell properties therefore improvement in culture method to maintain these properties is essential.

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Competing interests: The authors declare that no competing interests exist.

Received: 2017-07-14
Accepted: 2017-08-04
Published: 2017-09-05

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Keywords

Mesenchymal stem cells, Wharton's Jelly, Long term culture, Proliferation, Differentiation

Funding

TRGS0002-SG-2/2014

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