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Human mesenchymal stem cells isolated from entire umbilical cord and Wharton's jelly matrix using explants culture method display similar characteristics

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Background: Adult stem cells are of particular importance for applications in cell therapy and regenerative medicine. Bone marrow (BM) is the most common source used in research till now, however BM is a restricted source according to the availability and ethical issues. In recent years umbilical cord is established as an alternative source of mesenchymal stem cell (MSC) and is superior to BM and other adult tissues according to several MSC properties. In addition, for the purpose of clinical scale cell production for cell therapy, steps of cell isolation, expansion and culture required to be precisely adjusted to achieve the most cost effective, least time-consuming, and least labor-intensive method. In this regard we are going to compare two simple and cost-effective explant culture methods for isolation of mesenchymal stem cells from human umbilical cord.

Methods: Based on our literature review two simplest methods for isolation of stem cells from umbilical cord was selected. In the first methods cells are isolated from entire cord and in the second from Wharton's jelly matrix. Isolated cells then cultured in simple medium and no growth factor or additional supplement was added.

Results: MSCs obtained using these two simple methods display similar required standard characteristics corresponding to morphology, population doubling time, post thaw survival, surface antigenicity and differentiation into mesodermal lineages adipocytes, osteocytes, and chondrocytes.

Conclusion: MSCs can be obtained from both entire cord and Wharton's jelly easily and properly, and it seems that both tissues are suitable sources of stem cells for applications in clinical settings for regenerative medicine. However with respect to large scale methodology, isolation of MSCs from entire cord piece is less time-consuming and labor-intensive than from Wharton's jelly part of the cord.

Biography

Hojjat Sadeghi-Aliabadi is a Professor of Medicinal Chemistry at the University of Isfahan, Iran. He received his PhD from Bradford University of UK in 1996 and after that he has been working as an academic member of Faculty of Pharmacy at the University of Medical Sciences, Isfahan, Iran. He has been working on the biological evaluation of synthetic and natural compounds against cancer cell and also recently against cancer stem cells. He has been supervising more than 25 Pharm D students and 7 PhD students in this field.

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