

Comparative characterization of human and equine Wharton's jelly derived mesenchymal stem cells

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Mesenchymal stem cells (MSCs) have the capability to differentiate into wide range of specialized cells of mesodermal origin such as osteocytes, chondrocytes, adipocytes, cardiomyocytes, muscle fibers. Due to these properties, MSCs are considered as a new emerging treatment option and therapeutic agent in regenerative medicine. Promising results have been obtained after application of MSCs for treating tendon and joint disease in the equine model, making it favorable for therapeutic application. While the horse is considered a highly suitable model for orthopedic diseases, knowledge is lacking regarding the level of analogy of equine MSCs and their human counterparts. Therefore, the aim of this study was to assess the properties of human and equine Wharton's jelly derived MSCs in a direct comparison. Obtained MSCs, were characterized for their staminal markers, proliferation and adhesion potential, ultrastructural morphology and their ability in differentiate towards osteogenic, chondrogenic and adipogenic lineages. Results showed a similar pattern in the expression of staminal markers, while a light difference was observed in the proliferation and adhesion potential. Ultramorphological analysis showed nuclear and cytoplasmatic features comparable in human and equine MSCs. Finally, both MSCs were able to differentiate towards osteogenic, chondrogenic and adipogenic lineages. In conclusion, although revealing some potentially relevant differences, the study demonstrates a high level of analogy between human and equine MSCs, providing a basis for translational research in the equine model.

Keywords

Mesenchymal stem cells; human; horse; Wharton's jelly; comparative study.