



The Potential Stem Cell Source for the Future

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Clinical Image

As the techniques progress in regenerative medicine, the importance of comprehensive and collaborative research in different fields increases. The development of therapies in which stem cells are applied is of importance in the dentistry and oral biology. The stem cells have capacity for self-renewal and differentiation, which are main features to be utilized for the stem-cell therapy. Dental pulp is the vital inner core of teeth, which contains mesenchymal stem cells derived from the embryonic cranial neural crest [1,2]. Dental pulp stem cells are multipotent cells which express MSC-like and neural stem cell-like stem cell markers [1]. The dental pulp stem cells are isolated in non-invasive methods and utilized for the cellular therapy for central nervous system and retinal injury and disease [1]. The stem cells derived from dental pulp can be differentiated into multiple cells including osteogenic and adipogenic cells, which may be utilized for the stem-cell therapy [3]. The dental pulp stem cells differentiate into dopaminergic neurons *in vitro* after the treatment of the cocktail consists of sonic hedgehog, fibroblast growth factor 8, glial cell line-derived neurotrophic factor and forskolin [4]. One of the main challenges to be overcome is obtaining the sufficient amount and the number of cells as the cell source, which should be immune tolerant upon the implantation of the cells. The stem cells derived from the dental pulp may be the potential stem cell source, which would be appropriate for the autologous stem cell implantation. It is very important to maintain the cell bank for the long-term storage of stem cells. There would be a plenty of issues for the realization of the concept in which the stem cells derived from dental pulp are utilized for the stem cell therapy (Figure 1).

The potential tasks may include following:

- Quality assurance for non-contamination of non-intended materials, microorganisms or viruses
- Efficacy assessment after the long-term storage of stem cells
- Matching of batches and individuals
- Assessment of differentiation and proliferation capacity of cells
- Adjustment of advances in technology and history of cells stored
- Measurement of viable cells to be applied

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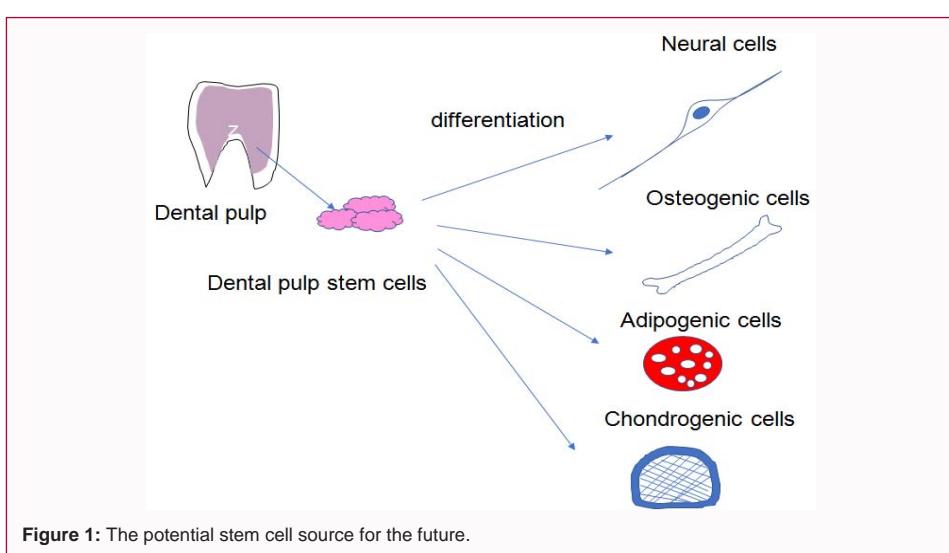


Figure 1: The potential stem cell source for the future.

The stem cells usually decrease the viability upon long-term storage, which means that the amount of the dental pulp stem cells may differ dependent on the condition of storage of the cells. The careful considerations would be essential for the excellent future in the dentistry field.

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