

Phenotypic Characterization of Dental Pulp Stem Cells Isolated from Irreversible Pulpitis with Dental Pulp Stem Cells from Impacted Teeth

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Abstract : Dental pulp inflammation resulting from dental caries often leads to a pathologic condition known as irreversible pulpitis and the currently managed by root canal treatment. Extirpation of the entire pulp tissue is done during this procedure, and the canal space is filled with synthetic materials. Recent studies in the stem cell biology state that some portion of the irreversibly inflamed pulp tissue could be viable with progenitor cells, having the properties similar to that of Mesenchymal stem cells. Hence, we aim to isolate Dental Pulp Stem Cells (DPSCs) from patients diagnosed with severe irreversible pulpitis and characterize the cells for the MSC specific markers. The pulp tissue was collected from the dental clinic and subjected to collagenase/dispase digestion. The isolated cells were expanded in culture, and the phenotypic characterization was done using flow cytometry. MSC specific markers such as CD-90, CD-73, and CD-105 were analysed along with negative markers such as CD-14 and CD-45. The isolated cells expressed positive expression for CD markers with CD90 and CD105 (> 95%) and CD73 (19%). The cells did not express the negative markers CD-14 and CD-45. The commercially available DPSCs from vital extracted teeth, preferably molar/wisdom teeth with large pulp cavity or incomplete root growth in young patients (aged 15-30 years) showed more than 90% expression for all the CD markers such as CD-90, 73 and 105, whereas negative for CD-14 and CD-45. The DPSCs isolated from inflamed pulp tissue showed a less expression for CD-73 compared to the commercially available DPSCs whereas, as the other two markers were found to show similar percentage of positive expression. This could be attributed to the fact that the pulp population is very heterogeneous and we used the pooled tissue from different patients. Hence the phenotypic characterization and comparison with the commercially available DPSCs proved that the inflamed pulp tissue is a good source of MSC like cells which can be utilized further for regenerative application.

Keywords : collagenase/dispase, dental pulp stem cells, flow cytometry, irreversible pulpitis

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