

Different isolation methods of dental pulp stem cells

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Abstract

Considering the ease of isolation and high expansion potential of pulp stem/progenitor cells isolated from wisdom and primary teeth they have been implicated as the most reliable autologous cell source in dental tissue engineering. Meanwhile, different isolation methods have remarkable impacts on the expansion potential of adult stem cells. In enzymatic digestion method extracted teeth as dental pulp sources are kept in PBS or medium containing at least 2 % (w/v) antibiotics until isolation procedure. Permanent teeth fractured with a mini hammer in order to get access to the pulp chamber and root canals. After washing with sterile PBS, pulp tissue cut into small pieces as much as possible (~1 mm³ pieces). Tissue pieces are washed six times with sterile PBS containing 1% antibiotic and 1% amphotericin and placed in 1 ml a solution of trypsin for 15 min in 37°C. Afterthought, tissues were cut in to smaller pieces and placed in six well plates for 10 min to dry. There are some variations in the mentioned method, for instance; using different enzymatic combination of collagenase type I and dispase instead of trypsin. In outgrowth method pulp tissue placed directly in a cell culture plate with the growth medium after washing with sterile PBS and cutting into small pieces.

In the present review, we discuss pros & cons of culturing human dental pulp of wisdom teeth using two methods; enzymatic digestion and outgrowth of stem cells from pulp tissue explants. The most significant differences in enzymatic digestion and outgrowth methods are in reported cell number and homogeneity. While the former is always higher in enzymatic digestion, tissue explants allow the expansion of fibroblastic-like cells in dental pulp cultures. Moreover, isolated dental pulp stem cell in outgrowth method is lower than enzymatic digestion in number but in homogeneity is higher than enzymatic digestion.

Key words: Dental pulp stem cell, Isolation,enzymatic digestion, Outgrowth.

Poster Presentation

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