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DENTAL SCIENCE
Editorial

Challenges in Dental Tissue Engineering

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Received: December 05, 2015; **Published:** December 14, 2015

Stem cells are considered as an internal repair system in the human body that has the capability to divide principally without limit to replenish other living cells. Upon division, each stem cell has the potential either to keep a stem cell or alternate to cell with a more particular function. Of late, researchers are mainly investigating two types of stem cells, embryonic stem cells and adult stem cells. Recently, breakthrough third type of stem cells was achieved when researchers and investigators succeeded to reprogram adult cells (not adult stem cells) in to a new type of stem cells called induced pluripotent stem cells (iPSCs) [1].

To achieve successful and safe method for missing oral tissues regeneration, stem cell-based technology is considered to represent a new edge in prosthodontic regenerative medicine. Since bone defects that arise after tooth loss usually result in moderate or even large bone defect, the restoration of alveolar ridge height is a major concern that usually bounds the effectiveness of dental implants and other prosthodontic treatments [2].

In this regard, to achieve efficient oral tissue regeneration, conventional regenerative dentistry has already developed scaffold and growth factor technologies [3,4]. However, it is still necessary to combine the present material-based technologies and foreseen stem cell-based technologies.

Recently, stem cells cell-sheet techniques have been applied to several diseased organs, including eye, heart and kidney. Basically, Cell sheets can be prepared on special laboratory dishes that are coated with a sensitive temperature-responsive polymer, that polymer changes from being hydrophobic to hydrophilic when the temperature is reduced. This change allows cells to be detached without treatment with enzymes that are commonly used to accurately detach growing cells from laboratory dishes. Eventually without destroying the cell-to-cell or cell-to-extracellular matrix interactions within the cell sheet [5,6].

Cell sheet technology has now been utilized in dentistry to achieve efficient regeneration of lost alveolar and periodontal tissues. Yet, more researches are required to challenge and validate the in vivo functionality of these cell sheets and in assessing the clinical advantage of these sheets over the traditional graft technologies.

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Volume 3 Issue 3 December 2015