**Letter To Editor**

# Placental-Derived Stem Cells for Dental Tissue Engineering: Trash or Treasure

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## Introduction

Stem cells are different from other cell types by two important characteristics. First, they are unspecialized cells which capable of renewing themselves through cell division. In addition, some cells are 'switched-on' after long periods of inactivity. Secondly, under certain physiologic or experimental conditions, they can be induced to differentiate into any tissue type in order to carry out specific tasks. In some organs, such as the gut and bone marrow, stem cells regularly divide to repair and replace damaged tissues. In other organs, however, such as the pancreas and the heart, stem cells only divide under special conditions. Stem cells remains pluripotent and theoretically, it can be induced to differentiate into any specialized cell type of choice [6,7]. These stem cells may be candidate sources for tissue engineering, including tooth, tissue and bone regeneration.

Human term placenta, a temporary organ with fetal contributions that is discarded postpartum, contains placenta mesenchymal stem cells (PMSCs) display typical mesenchymal characteristics such as great capacity for self-renewal while maintaining their multipotent differentiation potential and expression of common MSCs surface markers similar to those expressed by Bone marrow-MSCs. These PMSCs theoretically can differentiate into dental cell lineages will be useful for transplantation therapy in tooth decay, bone remodeling and periodontal diseases [1,2]. Investigations of dental differentiation potentials for various non-dental tissue-derived cells should also offer opportunities to advance tooth regeneration for clinical applications.

Beside tooth regeneration, periodontitis is one of the most prevalent infectious diseases. It is characterized by the destruction of tissues, such as alveolar bone, cementum and the PDL, that surround and support the teeth [9]. The goal of periodontal therapy is the complete regeneration of periodontal tissues, particularly where gross periodontal destruction has compromised the support of the tooth. In dentistry, the identification of mesenchymal stem cells (MSC)-like populations derived from placenta may lead to exciting possibilities for the application of tissue engineering as well as gene based therapies [3, 9,11].

Recent studies have demonstrated the potential placenta mesenchmal stem cells to differentiate into hepatocyte-, pancreatic-, vascular neural-like and endothelial-, cells [12]. Placenta has been reported to contain a population of multipotent stem cells demonstrating some of the characteristics of pluripotent ES cells including expression of stem cell markers c-kit, Thy-1, OCT-4, SOX2, hTERT, SSEA1, SSEA3, SSEA4, TRA1-60 and TRA1-81 [7] In addition, the chorionic villi of human known as placenta mesenchymal stem cells (PMSCs) are a rich source of stem cells [2,9]. The stem cell within the chorionic villi regulates PMSCs participate in placental tissue generation, maintenance and repair. It has been demonstrated that PMSCs can be differentiated *in vitro* under specific stimulatory environments into derivatives of the mesenchymal cell lineage such as osteocytes,

adipocytes, myocytes and chondrocytes [11].

Thus, placenta mesenchymal stem cells (PMSCs) offer a promising source of stem cells for dental regenerative medicine both therapeutic and toxicological applications. However, to the author knowledge, no definite method has been introduced to stimulate placental mesenchmal stem cell to tooth germ cells or tooth mesenchymal cells. As the presence of stem cells have been detected in so many researches, *In vitro* and *in vivo* experiments using PMSCs in future is aimed to provide promising results in dental tissue engineering.

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