Faculty of Dentistry

Proliferation Capacity and Osteogenic Potential of Human Dental Pulp Stem Cells from Permanent and Exfoliated Deciduous Teeth

Thesis

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Dedication

To my Family

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List of Abbreviations

BMMSC : Bone Marrow Mesenchymal Stem Cells

BMP : Bone Morphogenetic Protien

BSP II : Bone Sialoprotien II

CD : Cluster of Differentiation

CFU-F : Colony Forming Unit- Fibroblast

DEX : Dexamethasone

DFSC : Dental Follicle Stem Cells

DMEM : Dulbeco Modified Eagle Medium

DPSC : Dental Pulp Stem Cells

EBM : Eagle Basal Medium

ED : Enzyme Digestion

EDTA : Ethylene Diamine Triacetic Acid

ESC : Embryonic Stem Cells

FBS : Fetal Bovine Serum

FGF : Fibroblast Growth Factor

GP : Glycerophosphate

HLA : Human Leukocyte Antigen

hNDP : Stem cells from Human Natal Dental Pulp

HS : Human Serum

MEM : Modified Eagle Medium

MSC : Mesenchymal Stem Cells

MTT : Methyl Thyazol Tetrazolium

OC : Osteocalcin

ODHPSC : Osteoblast from Human Pulpal Stem Cells

OG : Out Growth

PBS : Phospate Buffer Solution

PD : Population Doubling

PDLSC : Periodontal Ligament Stem Cells

RA : Retinoic Acid

RT-PCR : Reverse Transcriptase- Polymerase Chain

SCAP : Stem Cells from Apical Pappilla

SCID : Severe Combined Immunodeficiency

SHED : Stem Cells from Human Exfoliated Deciduous

SMA : Smooth Muscle Actin

TGF : Transforming Growth Factor

α MEM : alpha Modified Eagle Medium

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Introduction

In recent years, stem cell researches have grown exponentially owing to the recognition that stem cell-based therapies have the potential to improve the life of patients with conditions that range from Alzheimer's disease to cardiac ischemia and regenerative medicine, like bone or tooth loss. Based on their ability to rescue and/or repair injured tissue and partially restore organ function, multiple types of stem/progenitor cells have been speculated. Growing evidence demonstrates that stem cells are primarily found in niches and that certain tissues contain more stem cells than others. Among these tissues, the dental tissues are considered a rich source of mesenchymal stem cells that are suitable for tissue engineering applications ***(Estrela et al., 2011)***.

Interestingly, there are several types of dental stem cells that are well characterized and described both in vitro and in vivo. They include dental pulp, periodontal ligament, apical papilla and dental follicle precursor cell. ***(Gronthos et al., 2000; Miura et al., 2003; Seo et al., 2004; Morsczeck et al.,***