شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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Adipose - Derived Stromal Vascular Fraction in Treatment of Osteoarthritis: Experimental Study

Thesis

Submitted for Partial Fulfillment of the Requirement of the Master Degree in Physical Medicine, Rheumatology and Rehabilitation

By

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Sherine Alaa

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List of Abbreviations

Abbreviation	Full term
AC	Articular Cartilage
ADAMTS	A disintegrin and metalloproteases with thromboplastin motifs
ADSCs	Adipose derived stem/stromal cells
Angpt-1	Angiopoietin-1
AP	Anteroposterior
ASCs	Adipose tissue derived stromal cells
ATC	Adipose tissue complex
BADSCs	Brown adipose derived stem cells
BAT	Brown adipose tissue
BBB	Blood brain barrier
bFGF	Basic fibroblast growth factor
BMI	Body Mass Index
BMP	Bone morphogenic protein
CD	Cluster of differentiation
COMP	Cartilage oligomeric matrix protein
COVID-19	Corona virus disease-19
CRP	C-reactive protein
CZ	Cartilage zone
DAMPs	Damage associated molecular patterns.
DMEM	Dulbecco's Modified Eagle Medium
DZ	Deep zone
ECM	Extracellular matrix
ECs	Endothelial Cells
EDTA	Ethylenediaminetetraacetic Acid
EPCs	Endothelial Precursor/Progenitor Cells
EV	Extracellular vesicle
FBS	Fetal bovine serum
FCM	Flow cytometry
FGF	Fibroblast growth factor
FITC	Fluorescein isothiocyanate

List of Abbreviations Cont...

Abb.	Full term
GAG	Glycosaminoglycan
GLP	Good laboratory practices
GMP	Good manufacturing practices
HA	Hyaluronic acid
HGF	Hepatocyte growth factor
HPF	High power field
HSCs	Hematopoietic stem cells
Hx&E	Hematoxylin and Eosin stain
IA	Induced arthritis
I-CS	Intra-articular corticosteroids
IFN-γ	Interferon gamma
IGF	Insulin growth factor
IGFBPs	Insulin like growth factor binding proteins
I-HA	Intra- articular hyaluronic acid
IL	Interleukin
IL-1RA	Interleukin 1 receptor antagonist
IZ	Intermediate zone
JAK/STAT	Janus kinase / signal transduction and activator of transcription.
JSN	Joint space Narrowing
KOA	Knee Osteoarthrtis
mAb	Monoclonal antibody
MMPs	Metalloproteases
MRI	Magnetic resonance imaging
MSC	Mesenchymal stem cells
NGF	Nerve growth factor
NSAIDs	Non- steroidal Anti- inflammatory drugs
OA	Osteoarthritis
PA	Posteroanterior
PBS	Phosphate buffer saline
PCR	Polymerase chain reaction

List of Abbreviations Cont...

Abb.	Full term
PDGF-BB	Platelet derived growth factor- BB
PRP	Platelet rich plasma
RBC	Red blood cell
RF	Radiofrequency
ROM	Range of motion
SD	Standard deviation
SLRP	Small leucine rich proteoglycan
SRY	Sex region Y
SVF	Stromal vascular Fraction
Sy-SADOA	Systemic slow acting drugs of OA
SZ	Superficial zone
TENS	Transcutaneous electrical nerve stimulation
TGF –β	Transforming growth factor β
TGF	Transforming growth factor
TIMPs	Tissue inhibitors of MMPs
TKA	Total knee arthroplasty
TNF	Tumor necrosis factor
Trk	Tropomyosin-receptor-kinase
US	Ultrasound
VAS	Visual analogue scale
VGEF	Vascular endothelial growth factor
VLS	Vulvar lichen sclerosis
WAT	White adipose tissue
WBC	White blood cells
WOMAC	Western Ontario and McMaster universities osteoarthritis index

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INTRODUCTION

Osteoarthritis (OA) is one of the leading causes of joint pain and disability ***(Arden and Nevitt, 2006).*** It's characterized by degeneration of articular cartilage, subchondral sclerosis and marginal osteophyte formation. OA is associated with chronic pain, stiffness, joint deformity and decreased range of motion ***(Hannan et al., 2000).*** Etiology of OA is multifactorial with hereditary, metabolic, hormonal and mechanical factors ***(Bhatia et al., 2013).*** Apart from these factors, age has been a primary factor, causing changes in extracellular matrix by increasing inflammatory cytokines and increase in the free radicals that causes the loss of the ability of the cartilage to regenerate in response to mechanical stress ***(Freitag et al., 2016).***

Regenerative cell therapies in treatment of knee OA such as adipose derived stromal vascular fraction (SVF) have been recently investigated ***(Bansal et al., 2017).*** SVF is the aqueous fraction derived from enzymatic digestion of lipoaspirate (the product of liposuction). This aqueous fraction is a combination of endothelial precursor cells (EPCs), endothelial cells (ECs), macrophages, smooth muscle cells, lymphocytes, pericytes, and pre-adipocytes among others. It has shown promise in regenerative and reconstructive medicine ***(Bony et al., 2016).*** SVF derived mesenchymal progenitor/stem cells can be easily expanded in vitro and has the potential in differentiation into diverse cell lineages ***(Han et al., 2015).***