



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



HANAA ALY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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HANAA ALY



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

Thesis

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the Master Degree in Physical Medicine, Rheumatology
and Rehabilitation*

By

Sherine Alaa El Din Mohamed Moussa

M.B, B.CH, Faculty of Medicine, Ain Shams University

Under supervision of

Prof. Dr. Mohamed Gamal El Din Zaki

*Professor of Physical Medicine, Rheumatology & Rehabilitation
Faculty of Medicine, Ain Shams University*

Prof. Dr. Manal Osman Mohamed

*Professor of Physical Medicine, Rheumatology & Rehabilitation
Faculty of Medicine, Ain Shams University*

Assist. Prof. Dina Abou Bakr Farrag

*Assistant Professor of Physical Medicine, Rheumatology & Rehabilitation
Faculty of Medicine, Ain Shams University*

*Faculty of Medicine
Ain Shams University
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ

سَبَّحَانَكَ لَا إِلَهَ إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

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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 Osteoarthritis
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*).