ROLE OF VASCULAR ENDOTHELIAL GROWTH FACTOR EXPRESSION IN PATHOGENESIS OF POSTMENOPAUSAL OSTEOPOROSIS

Thesis Submitted In Partial Fulfillment of the Requirements of M.D in Physical Medicine, Rheumatology and Rehabilitation

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CONTENTS

LIST OF ABBREVIATIONS

ActRIIA.........Activin Receptor II A
ActRIIA–IgG1: Activin Receptor II A linked to IgG1 Fc domain
B.V.................Bone Volume
BM.................Bone Marrow
BMC..............Bone Mineral Content
BMD..............Bone Mineral Density
BMI...............Body Mass Index
BMPs.............Bone Morphogenetic Proteins
BMU..............Basic Multicellular Unit
BSAP.............Bone Specific Alkaline Phosphatase
BSP................Bone sialoprotein
Ca..................Calcium
CBC...............Complete Blood Count
c-fms..............Macrophage colony stimulating factor receptor.
CIITA............Class II Transactivator
Cl^-..................Chloride ion
COX2............Cyclooxygenase 2
Ctsk...............Cathepsin k
CTX...............Carboxy-Terminal Telopeptide of Type I Collagen
DAB...............Diaminobenzidine
DAP12...........DNAX-Activating Protein
DBD...............DNA-Binding Domain
DBP...............Vitamin D Binding Protein
DCs................Dendritic Cells
DEXA............Dual-Energy X-Ray Absorptiometry
DKK..............Dickkopf
DXR...............Digital X-ray Radiogrammetry
E.S.................Eroded Surface
E1...................Estrone
E2...................Estradiol
E3...................Estriol
ECs................Endothelial Cells
EDTA............Ethylene-Diaminetetracetic Acid
EGF...............Epidermal Growth Factor

ELISA ....Enzyme-Linked Immunosorbant Assay
ERE ....Estrogen Response Element
ERs ....Estrogen Receptors
ERT ....Estrogen Replacement Therapy
ERα ....Estrogen Receptor Alpha
ERβ................Estrogen Receptor Beta
ESR................Erythrocyte Sedimentation Rate
FasL...............Fas Ligand
FcRγ...............Fc Receptor gamma
FDA ....Food and Drug Administration
FGFs..............Fibroblast Growth Factors
Flk-1 ....Fetal Liver Kinase-1
Flt-1 ....fms –like tyrosine kinase receptor 1
Frz ....Frizzled Receptor
FSH................Follicle Stimulating Hormone
GM-CSF........Granulocyte/Monocyte Colony-Stimulating Factor
H&E ....Hematoxylin and Eosin
H+ ....Hydrogen Ion
H_2CO_3...........Carbonic Acid
HCO_3^- ....Bicarbonate Ion
HIFs...............Hypoxia-Inducible Factors
HRP...............Horseradish Peroxidase
HRT...............Hormone Replacement Therapy
IFN-γ ....Interferon Gamma
IGFs...............Insulin-Like Growth Factors
IHC................Immunohistochemistry
ILs ....Interleukins
ITAM ....Immunoreceptor Tyrosine-Based Activation Motif
kDa ....kiloDalton
KDR ....Kinase insert Domain –containing Receptor
Kg/m^2.............Kilogram/Square Meter
LH ....Luteinizing Hormone
LRP5 ....LDL Receptor–Related Protein 5
MAP ....Mitogen Activated Protein
M-CSF...........Macrophage Colony-Stimulating Factor
MMP ....Matrix Metalloproteinase

MSCs.............Mesenchymal Stem Cells
NBF ....Neutral Buffered Formalin
NFATc1.........Nuclear Factor of Activated T cells 1
NF-κB............Nuclear Factor – kappa B
NK ....Natural Killer
Nrp ....Neuropilin
NSAIDs ....Non-Steroidal Anti-inflammatory Drugs
NTX...............Amino-Terminal Telopeptide of Type I Collagen
Ob.S...............Osteoblast Surface
OC ....Osteocalcin
OPG...............Osteoprotegrin
OPN...............Osteopontin
OSCAR ....Osteoclast-Associated Receptor
Osx.................Osterix
PBS................Phosphate-Buffered Saline
PDGF ....Platelet Derived Growth Factor
PGE2 ....Prostaglandin E2
PGs ....Prostaglandins
PI-3................Phosphatidylinositol-3
PIR-A ....Paired Ig-Like Receptor-A
PLCγ ....Phospholipase C gamma
PLGA ....Poly (lactic- co- glycolic acid)
PlGF ....Placenta Growth Factor
PsA ....Psoriatic Arthritis
PTH...............Parathyroid Hormone
QCT...............Quantitative Computed Tomography
QUS...............Quantitative Ultrasound
RA ....Rheumatoid Arthritis
RANK............Receptor Activator of Nuclear Factor kappa B
RANKL.........Receptor activator of nuclear factor kappa B ligand
RER...............Rough Endoplasmic Reticulum
RGD ....Arginine, Glycine and Aspartic acid
rhBMP-2 ....recombinant human Bone Morphogenetic Protein -2
rhVEGF-A ....recombinant human VEGF-A
ROS...............Reactive Oxygen Species
rPTH ....recombinant Parathyroid Hormone

RT-PCR ....Reverse Transcriptase Polymerase Chain Rection
Runx2 ....Runt-Related Transcription Factor 2
SERMs ....Selective Estrogen Receptor Modulators
SFRP ....Secreted Frizzled Related Protein
SIRP-β1.........Signal Regulatory Protein β1
T.S. ....Trabecular Separation
Tb. Th............Trabecular Thickness
TGF-β............Transforming Growth Factor-Beta
Th-1...............T helper-1
TNFs.............Tumor Necrosis Factors
TRAF6...........TNF Receptor Associated Factor 6
TRAP ....Tartrate-Resistant Acid Phosphatase
TREM-2........Triggering Receptor Expressed By Myeloid Cells-2
VDRs.............Vitamin D Receptors
VEGF ....Vascular Endothelial Growth Factor
VEGFR ....Vascular Endothelial Growth Factor Receptor
WHO ....World Health Organization
Wnt................Wingless-Type and Integrase 1

LIST OF FIGURES