



**Assessment of Klotho Protein and Fibroblast Growth
Factor -23 on the Progression of Atherosclerosis
in Vitamin D Deficient Egyptian Patients**

*A Thesis Submitted in Partial Fulfillment for the
Degree of Master in Biochemistry
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2018

Dedication

**To my father, my
mother, my sisters, my
brother, my sons and my
friends**

**Their love, encourage,
help made studies
possible and to them**

I owe my success

Thank you.

WALAA KAMAL AMIN

DECLARATION

**THIS THESIS HAS NOT BEEN SUBMITTED FOR
A DEGREE AT THIS OR ANY OTHER
UNIVERSITY**

WALAA KAMAL AMIN

Acknowledgement

First and foremost, my deep praises to "**Allah** " who had guided us to this: never could we have found guidance, had it not been for the guidance of **Allah**. Thanks to **Allah** of all gifts given to me.

From all my heart, I would like to thank **Dr. Eman M. Abd El Azeem**, professor of Biochemistry, Faculty of Science, Ain Shams University, for her encouragement, patience and endless help during the study period.

My special thanks are due to **Dr. Dina M. Seoudi**, assistant professor of Biochemistry, Faculty of Science, Ain Shams University, for her great support, instructive guidance and kind advice.

I am so grateful to **Dr. Diaa El Din A. Kamal**, lecturer of Cardiology, Cardiology department, Faculty of Medicine, Ain Shams University, for his guidance and help during the preparation of this work especially his help in collecting samples.

I am grateful to all my colleagues in Biochemistry Department, Faculty of Science, Ain Shams University, for providing assistance.

Walaa kamal Amin Abd el hady

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LIST OF ABBREVIATIONS

1α-OHase	1-alpha -hydroxylase
4 AAP	4-amino- antipyrine
ACE	Angiotensin-converting enzyme
Ang-II	Angiotensin II
APCs	Antigen presenting cells
BH4	Tetrahydrobiopterin
c-AMP	Cyclic adenosine monophosphate
CCL2	Monocyte chemo attractant protein-1
CE	Cholesterol esterase
CHDs	Coronary heart diseases
CKD	Chronic kidney disease
CO	Cholesterol oxidase
COX-1	Cyclooxygenase-1
CRP	C-reactive protein
CSFs	Colony stimulating factors
CVDs	Cardiovascular diseases
CXC10	Interferon gamma-induced protein-10
CXCL1	Motif chemokine ligand-1
CXCL8	Motif chemokine ligand-8
DCs	Dendritic cell
DMP-1	Dentin matrix protein 1
ECM	Extracellular matrix

ECs	Endothelial cells
EDCF	Endothelial derived contracting factor
e-NOS	Endothelial nitric oxide synthase
ESRD	End stage renal disease
ET-1	Endothelin -1
FAD	Flavin adenine dinucleotide
FGF-23	Fibroblast growth factor-23
FGFR-1	Fibroblast growth factor receptor-1
FGFRs	Fibroblast growth factor receptors
GK	Glycerol kinase
Glut-4	Glucose transporter -4
GM-CSF	Granulocyte–macrophage colony-stimulating factor
GPO	Glycerol phosphate oxidase
H₂O₂	Hydrogen peroxide
HDL-c	High density lipoprotein cholesterol
HRP	Horse radish peroxidase
ICAM-1	Intracellular adhesion molecule-1
IFN	Interferon
IGF-1	Insulin like growth factor-1

ILs	Interleukins
IR	Insulin receptor
KLF2	Krüppel-like Factor 2
Klotho	Klotho protein
LDL-c	Low density lipoprotein cholesterol
LPL	Lipoprotein lipase
LSS	Laminar shear stress
M1	Macrophage -1
M2	Macrophage -2
MBD	Mineral and bone disease
M-CSF	Macrophage- colony stimulating factor
MI	Myocardial infarction
MMP	Matrix metalloproteinase
NF-kb	Nuclear factor kappa -b
NK	Natural killer
NO	Nitric oxide
ox-LDL	Oxidized low density lipoprotein
Phex	Phosphate-regulating neutral endopeptidase
POD	Peroxidase
PTH	Parathyroid hormone
RAAS	Rennin-Angiotensin-Aldosterone system
RANKL	Receptor activator of nuclear factor kappa - B ligand
ROS	Reactive oxygen species
SMCs	Smooth muscle cells

TAG	Triacylglycerol
TGFs	Transforming growth factors
Th	T- helper
TMB	Tetra methyl benzidine
TNF- α	Tumor necrosis factor alpha
TNFs	Tumor necrosis factors
TRPC6	Transient receptor potential cation channel, subfamily C, and member 6
VCAM-1	Vascular cell adhesion molecule-1
VDBP	Vitamin D binding protein
VDRs	Vitamin D receptors
VLDL-c	Very low density lipoprotein cholesterol
VSMCs	Vascular smooth muscle cells

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