Potential role of Ultraviolet Radiation therapy in ameliorating the pathogenesis of Relapsing Remitting Multiple Sclerosois

THESIS
Submitted for partial fulfillment of M.Sc. Degree in Neuropsychiatry

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الدور العلاجى المحتمل للأشعة فوق البنفسجية لتحسين التسبب في التصلب المتناثر ذو الطبيعة الإنتكاسية

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Wael Mahmoud Ezzat

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LIST OF ABBREVIATIONS

1,25(OH)D	1,25-dihydroxy cholecalcifirol
1-OHase	1 alpha -hydroxylase
25(OH)D	25 hydroxy cholecalcifirol
ADAM	A disintegrin and metalloproteinase domain
AMP	Adenosine monophosphate
ANOVA	Analysis of variance
APCs	Antigen presenting cells
ATP	Adenosine triphosphate
AUA	American urological association
BBB	Blood-brain barrier
BDNF	Brain-derived neurotrophic factor
BMRC	British medical research council
CBC	Complete blood count
CCL	Chemokine C-motif ligand
CD	Clusters of differentiation
CH	Contact hypersensitivity
CLIA	Chemiluminiscent enzyme immunoassay
CMV	Cytomegalovirus
CNS	Central nervous system
CSF	Cerebrospinal fluid
CVS	Cardio-vascular stroke
CXCL	Chemokine (C-X-C Motif) ligand
DC	Dendritic cells
DNA	Deoxyribonucleic acid
DTH	Delayed type hypersensitivity
DW	Diffusion weighted

LIST OF ABBREVIATIONS

EAE	Experimental allergic encephalomyelitis
EBV	Epstein-barr virus
EDSS	Expanded disability status scale
ELISA	Enzyme-linked immunosorbent assay
Fas	Tumor necrosis factor receptor superfamily member 6
FLAIR	Fluid attenuated inversion recovery
GH	Growth hormone
GM	Gray matter
HC	Healthy control
HHV	Human herpes virus
HIV	Human immunodeficiency virus
HLA	Human leukocyte antigen
HRP	Horseradish peroxidase
ICAM-1	Intracellular adhesion molecule-1
ICARS	International cooperative ataxia rating scale
IFN	Interferon
IGF	Insulin-like growth factor
Igs	Immunoglobulins
IL	Interleukin
IM	Immunomodulatory
iNOS	Inducible nitric oxide synthase
IU	International units
JNK	c-Jun N-terminal kinase
LFA-1	Leukocyte functional antigen
LL	Lower limb
MAP kinase	Mitogen-activated protein kinase
MAS	Modified ashworth scale
MBP	Myelin basic protein
MCP	Monocyte chemotactic protein
MED	Minimum erythema dose

LIST OF ABBREVIATIONS

MHC	Major histocompatibility complex
MICARS	Modified international cooperative ataxia rating scale
MMF	Mycophenolate mofetil
MMPs	Matrix metalloproteinases
MMSE	Mini mental state examination
MO	Monocyte
MP	Methyl prednisolone
MRC	Medical research council
MRI	Magnetic resonance imaging
MRS	Magnetic resonance spectroscopy
MS	Multiple sclerosis
MSH	Melanocyte stimulating hormone
NG2	Neural glia antigen 2
NGM	Normal grey matter
NKT	Natural killer T cell
NMO	Neuromyelitis optica
NO	Nitric oxide
OCB	Oligoclonal band
OCT	Optical coherence tomography
O.D	Optical densit
OPC	Oligodendrocyte precursor cells
PET	Positron emission tomography
PMN	Polymorphnuclear neutrophils
PPMS	Primary progressive multiple sclerosis
PTH	Parathyroid hormone
PTHrP	PTH related peptide
QoL	Quality of life
RANK	Receptor activator nuclear factor-Kb
RANKL	Receptor activator nuclear factor-Kb ligand
RANTES	Regulated upon activation, normal T-cell expressed, and

	secreted
RNA	Ribonucleic acid
ROI	Regions of interest
ROM	Range of motion
RORγ	Retinoid-related orphan receptor gamma
ROS	Reactive oxygen species
RRMS	Relapsing remitting multiple sclerosis
SD	Standard deviation
SDMT	Symbol digit modalities test
SHPT	Secondary hyperparathyroidism
SPECT	Single photon emission computerized tomography
SPMS	Secondary progressive multiple sclerosis
SPSS	Staistical package version 12
TGF-β	Transforming growth factor beta
Th1	T helper 1
Th2	T helper 2
TLR	Toll-like receptors
TNF-α	Tumor necrosis factor-A
TRAF-6	Tumor necrosis factor receptor associated factor-6
TRAIL	Tumor necrosis factor related apoptosis including ligand
Treg	Regulatory T cell (suppressor T cell)
TYK2	Tyrosine kinase 2
UCA	Urocanic acid
UL	Upper limb
UVR	Ultraviolet radiation
VCAM-1	Vascular cell adhesion molecule
VDR	Vitamin D receptors
VEP	Visual evoked potential
VLA-4	Very Late antigen-4
WHO	World health organization

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Abstract

Multiple sclerosis (MS) is a devastating neurological disease that attacks young adults and affects all aspects of their lives. vitamin D deficiency is common in MS patient and may play a role in its pathogenesis. Recent studies suggest ultraviolet radiation (UVR)/vitamin D is protective against the development of multiple sclerosis (MS). Ultraviolet radiation (UVR) influences the immune system.

Key Words:

-Multiple sclerosis - Vitamin D

-Ultraviolet radiation