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Synergistic Effect of Thymoquinone and Interferon Alpha on Immunological Dysfunctions and Oxidative Damage in γ - irradiated Rats

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(Zoology)

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اِنَّا فَتَحْنَا لَكَ فَتْحًا مُبِينًا

لِيُغْفِرَ لَكَ اللَّهُ مَا تَقَدَّمَ مِنْ ذَنْبِكَ
وَمَا تَأَخَّرَ وَيُتِمَّ نِعْمَتَهُ عَلَيْكَ وَيَهْدِيَكَ صِرَاطًا
مُسْتَقِيمًا • وَيُنْصِرَكَ اللَّهُ نَصْرًا عَزِيزًا •

Dedication

This thesis is dedicated to the memory of my sister Marwa badr and my friend Ali Zidane. I miss them every day, but I am glad to know they saw this process through to its completion, offering the support to make it possible, as well as plenty of friendly and encouragement

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*List of
Abbreviations*

LIST OF ABBREVIATIONS

Ag	Antigen
ALP	Alkaline phosphatase
ALT	Alanine aminotransferase
APCs	Antigen presenting cells
ARS	Acute radiation syndrome
ASK1	Apoptosis signal regulating kinase1
AST	Aspartate aminotransferase
AV	Annexin V
Bax	BCL2 associated-X protein
Bcl-2	B cell lymphoma-2 protein
BM	Bone marrow
BMT	Bone marrow transplantation
Caspase-3	Cysteine-aspartic proteases-3
CAT	Catalase
CBC	Complete blood count
CD	Cluster of differentiation
CRP	C-reactive protein
CRS	Cutaneous radiation syndrome
CTLs	Cytotoxic T-cells
DC	Dendritic cell
DNA	Deoxyribonucleic acid
DSBs	Double strand breaks
EDTA	Disodium ethylene diamine tetraacetic acid
ER	Endoplasmic reticulum
FITC	Fluorescein isothiocyanate
G-CSF	Granulocyte colony-stimulating factor

γ-GT	Gamma- glutamyl transferase
GSH	Glutathione
GSH-px	Glutathione peroxidase
Hb	Hemoglobin
Hct	Hematocrit
HDL-C	High-density lipoprotein cholesterol
HLA-DR	Human leukocyte antigen D-related
HR	homologous recombination
HPCs	Hematopoietic progenitor cells
HSCs	Hematopoietic stem cells
IBD	Inflammatory bowel disease
IFN-α	Interferon alpha
IFN-γ	Interferon gamma
IL	Interleukins
IL-1R	Interleukin-1 receptor
IR	Ionizing radiation
LAK	Lymphocyte-activated killer cells
LDL-C	Low-density lipoproteins cholesterol
LPS	Lipopolysaccharide
MAPK	Mitogen-activated protein kinase
MCH	Mean corpuscle hemoglobin
MCHC	Mean corpuscle hemoglobin concentration
MCV	Mean corpuscle volume
MDA	Malondialdehyde
MDSC	Myeloid-derived suppressor cells
MHC	Major histocompatibility complex
MN-PCE	Micronuclei in polychromatic erythrocytes
MS	Multiple sclerosis

NF-kB	Nuclear factor-kappa B
NIR	Non-ionizing radiation
NK	Natural killer
NO	Nitric oxide
NS	<i>Nigella sativa</i>
OA	Osteoarthritis
PARP	Poly ADP-ribose polymerase
PBMC	Peripheral blood mononuclear cells
PD-1	Programmed death-1
PE	Phycoerythrine
PI	Propodium iodide
pol η	polymerase eta
RA	Rheumatoid arthritis
RBCs	Red blood corpuscles
ROS	Reactive oxygen species
SCF	Stem cell factor
SDF- 1	Stromal derived factor-1
SOCS3	Suppressor of cytokine signaling-3
SOD	Superoxide dismutase
STAT	Signal transducer and activator of transcription
TBA	Thiobarbituric acid
TC	Total cholesterol
TCA	Trichloroacetic acid
TG	Triglycerides
TGF-β	Tumor growth factor -beta
Th	T helper
TNF-α	Tumor necrosis factor
TPO	Thrombopoietin

TQ	Thymoquinone
Tregs	T regulatory cells
UV	Ultraviolet
VLDL	Very low-density lipoproteins
WBC	White blood cell

*List of
Tables*