

**THE ANTIDEPRESSANT EFFECT OF MORIN IN AN  
EXPERIMENTAL MODEL OF DEPRESSION IN RATS: IMPACT ON  
NEURODEGENERATION, INFLAMMATION AND APOPTOSIS**

*Thesis submitted for the partial fulfillment of the Master Degree in Pharmaceutical  
Sciences (Pharmacology & Toxicology)*

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قال تعالى:

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( العلق 3-5 )



## Dedication

This thesis is dedicated to the **soul of my father** and to my **beloved mother**. Words can never express my sincere thanks to **them** their endless love, support and encouragement to pursue this degree. They taught me how to face challenges strongly with faith and courage, they are a constant source of inspiration in my life and they always push me to achieve my goals. Without their encouragement through my life, I could not have the ability to finish this work. God bless **my mother** for me and let **my father's soul** rest in peace.

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**List of abbreviations**

5-HT	Serotonin/5-hydroxytryptamine
AD	Alzheimer's disease
ADs	Antidepressant drugs
AIM	Absent in melanoma
ASC	Apoptosis-associated speck-like protein containing a caspase recruitment domain
ATP	Adenosine triphosphate
BDNF	Brain-derived neurotrophic factor
CASP-1	Caspase1
CASP-3	Caspase3
CLR	C-type lectin receptors
CMDD	Chronic major depressive disorder
CRS	Chronic restraint stress
CSDS	Chronic social defeat stress
CUMS	Chronic unpredictable mild stress
CUSS	Chronic unpredictable severe stress
DA	Dopamine
DAMPs	Damage-associated molecular patterns
D-GaIN	D-galactosamine
DMSO	Dimethyl sulphoxide
DN	Diabetic neuropathy
DNA	Deoxyribonucleic acid
DOCA	Deoxycorticosterone acetate
DOX	Doxorubicin
DTNB	5'5'dithiobis(2-nitrobenzoic acid)
ECT	Electroconvulsive therapy
EDTA	Ethylenediaminetetraacetic acid
ELISA	Enzyme-linked immunosorbent assay
EP	Epinephrine
FST	Forced swim test and
GM	Gentamicin
GR	Glucocorticoid receptor
GSH	reduced glutathione
H&E	Hematoxylin & Eosin
HC	Hippocampus

## List of Abbreviations

HCl	Hydrochloric acid
HPA	Hypothalamic–pituitary–adrenal
HPRT	Hypo-xanthine phospho-ribosyl transferase
HRP	Horseradish Peroxidase
IGF-1	Insulin growth factor 1
IL-1 $\beta$	Interleukin-1 $\beta$
IL-6	Interleukin-6
IPAF	ICE-protease activating factor
KET	Ketamine
LPS/CMS	Lipopolysaccharide/chronic mild stress
LPS/SAL	Lipopolysaccharide/saline
LRR	leucine- rich repeat
MAO	Monoamine oxidase
MAOIs	Monoamine Oxidase Inhibitors
MCAO	Midbrain Carotid artery occlusion rats
MDA	Malondialdehyde
MDD	Major depressive disorder
MIRI	Myocardial ischemia-reperfusion injury
MPP+	1-methyl-4-phenylpyridinium ion
MPTP	Mitochondrial permeability transition pore
MRAP-1	Multi-drug resistance associated protein-1
mRNA	Messenger ribonucleic acid
MSU	Monosodium urate
N2A	Neuroblastoma
NACHT	Nucleotide-binding oligomerization and N-terminal
NaOH	Sodium hydroxide
NDRIs	Norepinephrine Dopamine Reuptake Inhibitors
NE	Norepinephrine
NF- $\kappa$ B	Nuclear factor kappa B
NGF	Nerve growth factor
NLR	(NOD)-like receptors
NLRC	NLR family CARD domain-containing protein
NLRP3	NLR family, pyrin domain-containing 3
NOD	Nucleotide-binding oligomerization domain
Nrf2	Nuclear erythroid factor 2-related factor
OD	Optical density

## List of Abbreviations

OFT	Open field test
OPT	O-phthalaldehyde
P2X7	ATP purinergic type 2X7
PAMPs	Pathogen-associated molecular patterns
PBS	Phosphate buffered saline
PD	Parkinson disease
PFC	Prefrontal cortex
PRRs	Pattern recognition receptors
PYD	Pyrin domain
RARs	Retinoic acid receptors
RIG	Retinoic acid-inducible gene
RIR	(RIG)-like RNA helicases
ROS	Reactive oxygen species
SABC	HRP-Streptavidin Conjugate
SAD	Seasonal affective disorder
SAL/CMS	Saline/chronic mild stress
SF	Sevoflurane
SNRIs	Serotonin Norepinephrine Reuptake Inhibitors
SP	Sucrose preference
SphK1/S1P	Sphingosine Kinase1 and Sphingosine-1-phosphate
SSRIs	Selective Serotonin Reuptake Inhibitors
TBARS	Thiobarbituric acid reactive substances
TCA	Trichloroacetic acid
TCAs	Tricyclic Antidepressants
TetCAs	Tetracyclic Antidepressants
TIR	Toll/IL-1 receptor
TLRs	Toll-like receptors
TMB	Tetramethylbenzidine
TNF- $\alpha$	Tumor necrosis factor-alpha
TrkB	Tropomyosin-related kinase B
TST	Tail suspension test
UNX	Uninephrectomized
XCHT	Xiao-Chai-Hu-Tang

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