# Molecular Intervention of Parkinson's disease

### Essay

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# التدخل الجزيئي في علاج مرض الباركنسون

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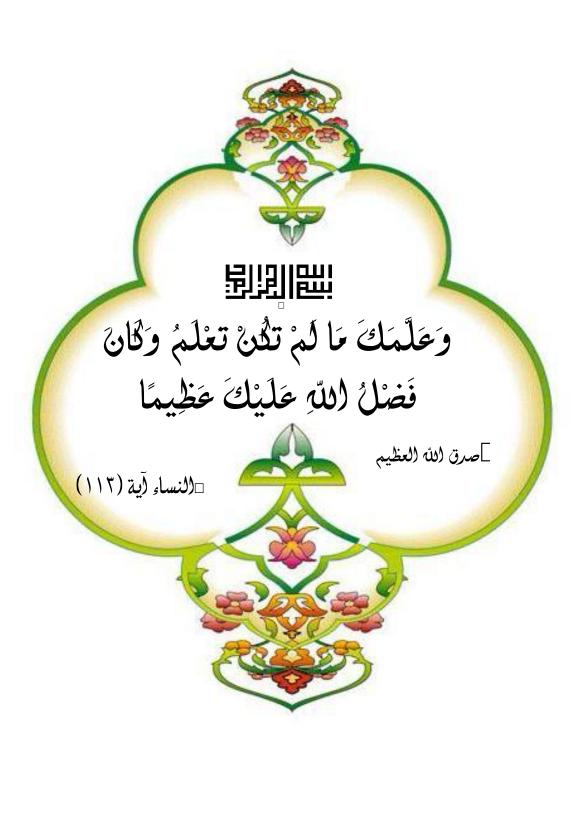
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### **Table of Contents**

List of Abbreviations	I
List of Tables	VI
List of Figures	VII
Chapter I: Introduction and Aim of the Work	1
Chapter II: Neuroanatomy of Parkinson's disease	8
Chapter III: Pathopysiology of Parkinson's disease	22
Chapter IV: Diagnosis of Parkinson's disease	48
Chapter V: Treatment of Parkinson's disease	
- Surgical Treatment of PD	
- Gene Therapy of PD	
- Cell Based therapies of PD	118
Discussion	153
Summary	160
Conclusion & Recommendations	166
References	170
Arabic Summary	



### **List of Abbreviations**

ANT2/ANT3	Neutarin 2 & Neutarin 3
A2A	Adenosine-2A
AADC	Aromatic amino acid decarboxylase
AAV2	Adeno associated virus 2
ACC	Anterior cingulate cortex
Ach	Anticholinergic
AD	Autosomal dominant
AMPA	α-amino-3-hydroxyl-5-methyl-4-isoxazole- propionate
AR	Autosomal recessive
ARJP	Autosomal recessive juvenile Parkinsonism
ASC	Adult stem cells
ATP	Adenosine triphosphate
BAG1	Bcl-2–associated athanogene 1
BDNF	Brain derived neurotrophic factor
bFGF	Basic fibroblast growth factor
BFGF	Basic fibroblasts growth factors
BMSC	Bone marrow stromal cell
BMSCs	Bone marrow stem cells
CAP	Capsid
CDNF	Cerebral dopamine neurotrophic factor
CeM	Central medial thalamic nuclei
CL	Central lateral thalamic nuclei
cm	Centimeter



CNS	Central nervous system
CNTF	Ciliary neurotrophic factor
COMT	Catechol-0-methyl transferase
CREB	cAMP response element binding
CSF	Cerebrospinal fluids
CSP	Co-operative Study program
D1R	Dopamine receptor 1
D2R	Dopamine receptor 2
DA	Dopamine
DARPP-32	Dopamine and cAMP-regulated phospho- protein
DBS	Deep brain stimulation
DG	Dente gyrus
dPL	Dorsal prelimbic cortices
DR3	Dopamine receptor 3
Erk1/	Erk2 extracellular signal-related kinase 1 / 2
ESC	Embryonic stem cells
FD	Fluro dopa.
GABA	Gamma-aminobutyric acid
GAD	Glutamic acid decarboxylase
GDNF	Glial cell derived neurotophic factor
GID(s)	Graft-induced dyskinesias
Glut	Glutamate
GP	Globus pallidus
GPe	Globus pallidus, externa
GPi	Globus pallidus, interna



_	
GSH	Gluthione.
HD	Huntington's disease
hESC	(human) embyonic stem cell
HSV	Herpes simplex virus
Hz	Hertz
IL	Infralimbic cortex
IMD	intermediodorsal thalamic nuclei
IPSC	Induced pluripotent stem cells
KB	Kilo byte
LD	Levodopa
LDB	Dementia with lewy bodies
LID(s)	Levodopa-induced dyskinesias
LRRK2	leucine rich repeat kinase 2 gene
MANF	Mesencephalic astrocyte derived neurotrophic factor
MAO-B	Monoamine oxidase-B
MAP	Mitogen-activated protein kinase
MD	Movement disorders
MEK	Mitogen-activated protein kinase kinase
Mi RN	Micro Ribonucleic acid
MIBG	Metaiodobenzlguaindine
Mm	Millimeter
mos	Months
MPTP	1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine
mRNA	Messenger ribonucleic acid
MSC	Mesenchymal stem cells



MSN	Medium spiny neuron
NICD	Notch 1 intracellular domain
NMDA	N-methyl-D-aspartic acid
NR1	NMDA receptor subunit 1
NR2A	NMDA receptor subunit 2A
NR2B	NMDA receptor subunit 2B
NR4A2	Nuclear receptor subfamily4.
NTFS	Neurotrophic factors
PARK 8	Parkinson's disease 8
PARS	Parkinson's associated risk syndrome
PCN	Paracentral thalamic nuclei
PD	Parkinson's disease
PET	positron emission tomography;
PFC	Prefrontal cortex
PINK1	PTEN induced putative kinase 1.
PKA	Protein kinase A
PKC	Protein kinase C
PNS	Peripheral nervous system
PPN	Pedunculopontine tegmental nucleus
PSP	Progressive supranuclear palsy
PSTP	Physician Scientist Training Program
PVN	Paraventricular thalamic nuclei
R	Rostral
RBD	Rapid eye movement sleep behavior disorder
REP	replication



	T	
RM-ANOVA	Repeated measures - analysis of variance	
ROS	Reactive oxygen species	
RPEC	Retinal pigmented epithelial cell	
Sh RNA	Short hair pin Ribonucleic acid	
SNCA	Synuclein, alpha	
SNpc	Substantia nigra, pars compacta	
SNpr	Substantia nigra, pars reticulate	
SOD	Superoxid dismutase.	
SPECT	Single Photon Emission Computerized Tomograghy	
sq	Subcutaneous	
SSRI	Selective Sertonine reuptake inhibitors	
STN	Subthalamic nucleus	
SVZ	Subventricular zone	
TH	Tyrosine hydroxylase	
TH-ir	Tyrosine hydroxylase immunoreactive	
UC-COM	University of Cincinnati College of Medicine	
UCH- LI	Ubiquitin carboxy-terminal esterase L1.	
um	Micrometer	
UPDRS	Unified parkinson's disease rating scale	
UPS	Ubiquitin proteasome system.	
VA	Veterans affairs	
Veh	Vehicle	
VIM	Ventralis intermedius	
VM	Ventral mesencephalon	
vPL	Ventral prelimbic cortices	



VTA	Ventral tegmental area
Wks	Weeks.
β-CIT	Beta-(4-iodophenyl) tropane.
3OMD	Three O methyl dopa
6-OHDA	6-hydroxydopamine

### List of Tables

Table	Title	Page
Table (1)	Summary of basal ganglia nomenclature	10
Table (2)	Proteins associated with hereditary forms	25
	of Parkinson's disease	
Table (3)	Summary of symptoms of PD	56
Table (4)	Therapeutic Targets, Agents, and	103
	Approaches for Gene Therapy of PD	
Table (5)	Current status of the different gene	117
	therapy approaches in PD	
Table (6)	A brief summary of the stem cell types	152
	that have a potential to generate suitable	
	dopaminergic neurons and their	
	advantages and disadvantages	

# **List of Figures**

Figure	Title	Page
Fig. (1)	The Striatum; lateral view of the caudate	12
	and putamen	
Fig. (2)	Schematic representation of somatotopic	13
	organization of the striatum	
Fig. (3)	Schematic of Normal and Parkinsonian	21
	basal ganglia circuitry.	
Fig. (4)	Etiology of Parkinson's disease.	28
Fig. (5)	Preclinical detection of PD	49
Fig. (6)	Hypothesis suggests that pathologic	52
	changes are first noted in the olfactory	
	region and lower brainstem, and only	
	later extend to involve dopamine neurons	
	in the SNc (Courtesy of Heiko Braak)	
Fig. (7)	Differential diagnosis of Parkinson's	57
	disease	
Fig. (8)	Fluorodopa (FD)-PET study in a normal	69
	individual (left panel) and a patient with	
	PD	
<b>Fig.</b> (9)	Site of actions of PD Drugs	74
<b>Fig.</b> (10)	Metabolism of Levodopa	75
Fig. (11)	Mechanism of Serotonin, MAOI drugs	78
Fig. (12)	Sagittal section, the preferred surgical	83
	targets for deep brain stimulation to treat	
	symptoms of advanced Parkinson	
	disease	

## 🕃 List of Figures 🗷

Figure	Title	Page
Fig. (13)	Surgical technique for deep brain	85
	stimulation.	
Fig. (14)	Restorative therapy of PD	92
Fig. (15)	Viral vectors of gene therapy	94
Fig. (16)	Triple transfection strategy for the in	97
	vitro production of recombinant	
	adenoassociated viruses	
Fig. (17)	Gene therapy using an Adenovirus	100
	vector	
Fig. (18)	There are two key approaches of Stem	119
	cell therapy that can be applied in PD	
Fig. (19)	Stem cells; definition The level of	125
	differentiation capacity in the stem cells	
	depends on the stage in which they are	
	isolated.	
Fig. (20)	Schematic illustration of possible	133
	sources of stem cells for therapy in	
	Parkinson's disease	
Fig. (21)	Strategy for MSC transplantation in PD	136
	patients	
Fig. (22)	Induction of dopamine neurons from	143
	MSCs	

#### Introduction

Parkinson's disease (PD) is a progressive neurodegenerative disorder associated with loss dopaminergic nigrostriatal neurons. It is named after James Parkinson, the English physician who described the shaking palsy in 1817. It is recognized as the second most common neurodegenerative disorder after Alzheimer's disease. The likelihood of developing Parkinson's disease increases with age. Parkinson's disease is more common with advancing age. It affects as many as 1.5% of individuals older than 65 years and as many as 3.5% of individuals older than 85 years (Olanow et al., 2009).

Symptoms of Parkinson's disease are slowly progressive. Well-recognized clinical features of Parkinson's disease are slowed movements, tremors, rigidity, and difficulties with gait and balance. However, other features commonly occur, including changes in olfaction, autonomic function, cognitive function, affect, sleep, and energy level (*Burn et al.*, 2006).

Parkinson's disease is characterized pathologically by the selective loss of dopaminergic neurons from the substantia nigra, and by the presence of Lewy bodies in surviving cells and Lewy neurites in brain parenchyma. The main protein component of Lewy bodies and Lewy neurites is  $\alpha$ -synuclein,