

EPIGENETICS IN PARKINSON'S DISEASE

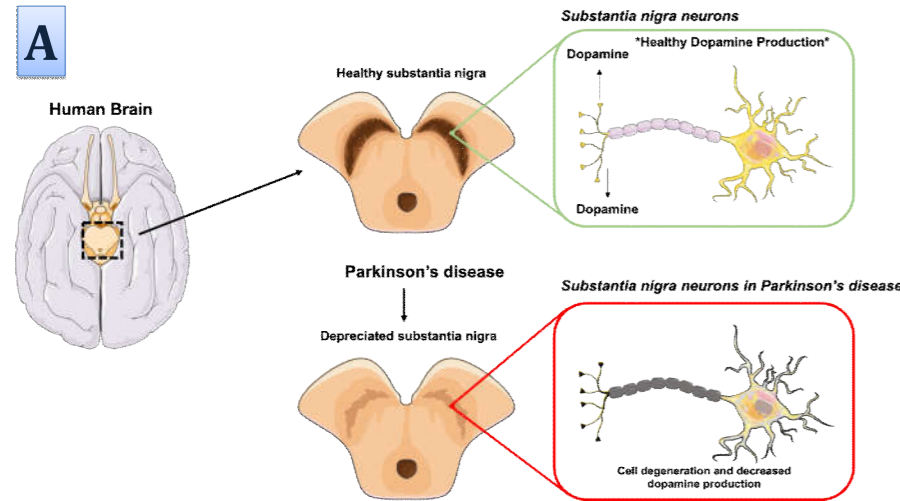
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Introduction

Parkinson's disease (PD) is an extremely complex, multifactorial neurodegenerative disease with defects of several mechanisms involved in the onset and progression of the disease.



DNA methylation, histone changes and altered microRNA expression are being intensively investigated due to their possible involvement in PD.

Keywords

Parkinson's disease, epigenetics, neurodegeneration, dopamine

Material and methods

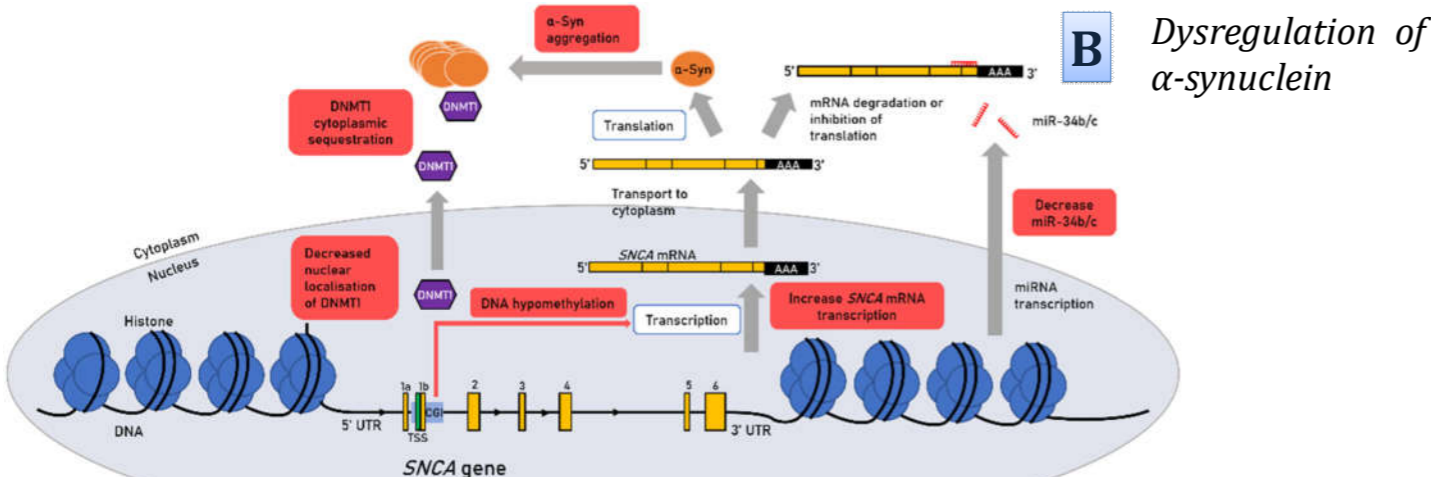
Review of the results of studies on the role of epigenetics in PD published in: - PubMed; - Medscape; - Elsevier.

Purpose

Analysis of the role of epigenetic changes in the:			
etiology	pathogenesis	manifestation	progression

Results

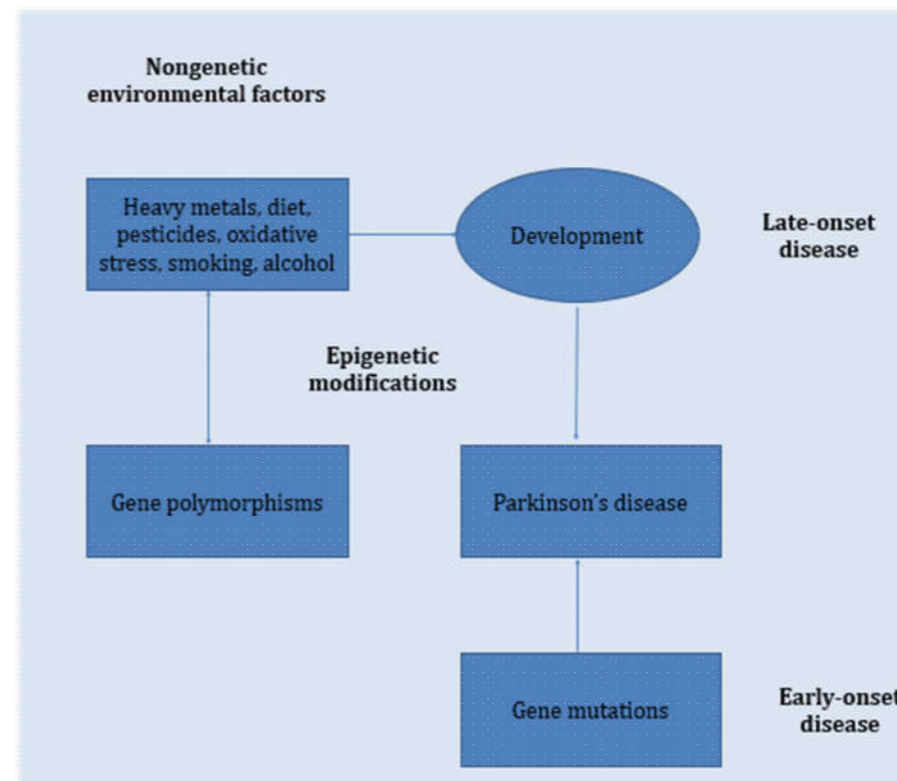
Epigenetic modulation is responsible for inducing differential gene expression, which is essential for regulating neurogenesis and adaptation to the environment.



C Epigenetic mechanisms and the genes they affect, involved in the development of PD

Epigenetic mechanism	Modification	Function
DNA hypermethylation	MAPT	Involved in age at disease onset and disease status in idiopathic PD
	PCG-1α	Dysregulation of inflammatory signaling
DNA hypomethylation	SNCA gene	Accumulated α-synuclein mitochondrial dysfunction
	PARK2 gene	Unknown
MicroRNA	miR-34b miR-34c	reduction Parkin (encoded by PARK2) expression levels and cell viability along with mitochondrial dysfunction and altered oxidative stress
	miR-153 miR-7	downregulate SNCA expression
	miR-133b	Regulates the maturity and function of the midbrain dopaminergic neurons
	miR-205	Regulates the expression of LRRK2
Histone deacetylation	LRRK2 gene	Neuronal cytotoxicity

D Relation between the type of factors (environmental factors/genetic factors/ their combination) and the progression of PD (early/late onset)



Conclusions
The etiology and pathogenesis of PD is genetically, epigenetically and environmentally conditioned. Genomic and epigenomic discoveries in PD have allowed the development of targeted therapies for maintaining/restoring the epigenetic profile of neurons.