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The potential role of propolis on the therapeutic effectiveness of L-dopa during development of parkinsonism in rats

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Background: Parkinson's disease (PD) is a geriatric neurodegenerative disorder where neuroinflammation and oxidative stress play a prominent role in the mechanisms underlying dopaminergic neurons degeneration. The immediate dopamine precursor L-dopa was the first efficient drug for PD treatment and remains the mainstay one, however long-term use is associated with motor fluctuations and dyskinesias. Propolis is one of the most important resinous natural product with wide range of biological activities as antiinflammatory and antioxidant, it has been demonstrated for prevention of geriatric neurodegenerations.

Objective: To evaluate the efficacy of Propolis either alone or with L-dopa against rotenone-induced PD in rats and to investigate the possibility of using Propolis as an adjunct therapy for reducing L-dopa dosage without compromising its therapeutic outcome.

Methods: Six groups of rats were used for 19 days; one normal group and five Rotenone (2.5 mg/kg SC) groups. One of the RT groups served as control PD model while the others treated with each of the following: L-dopa (10 or 25 mg/kg PO), Propolis (300 mg/kg PO) or both Propolis and L-dopa (10 mg/kg PO). Catalepsy, open-field and Y-maze tests were used for assessment of motor and cognitive performances. Striatal monoamines, acetylcholinesterase (AChE) as well as mitochondrial complex-1 were measured. In addition, oxidative stress and neuroinflammatory markers as well as caspase-3 expression were also evaluated besides histopathological examinations of different brain regions.

Results: Treatment with Propolis and/or L-dopa ameliorated cognition and locomotor activity impairments induced by RT. Moreover, depletions in monoamines, mitochondrial complex-1 and elevations in AchE, caspase-3 expression oxidative as well as neuroinflammatory markers were also decreased. Histopathological examinations confirmed the pronounced effects obtained by combination of Propolis with low dose L-dopa than the higher used dose alone.

Conclusion: Propolis is efficient in protection from PD development and represents a suitable adjuvant therapy that can be translated to marked reduction of the long-term treatment side effects by the mainstay therapy L-dopa. Consequently, Propolis could be recommended as a disease-modifying therapy of PD as well as a promising adjuvant therapy with L-dopa especially when given early in the treatment course.

Biography

Azza A Ali has completed her PhD specialized in Pharmacology and Toxicology from Faculty of Pharmacy, Cairo University, Egypt. Her postdoctoral studies included different scientific aspects especially on neurodegenerative disorders; she also developed research line of behavioral pharmacology in Egypt. She is member of many scientific societies as (AAPS) and Alzheimer's Association (ISTAART). She is also Editorial Board Member of many international Journals as Brain Disorder & Therapy, Acta Psychopathologica, EC Pharmacology and Toxicology as well as Organizing Committee Member and Chairperson at many international Conferences as the International Conference on Brain Disorders & Dementia Care, Canada (2017) and International Conference on Parkinsons Disease & Movement Disorders, USA (2017). She published more than 60 papers in reputed journals, supervised and discussed more than 90 PhD and MSc thesis and actively participated by oral and posters presentations at many international conferences especially on Alzheimer's disease and Dementia as well as on Parkinsons disease as Dementia Conferences (2015, 2016), Alzheimer's Association International Conference (AAIC 2016, 2017) and Parkinsons Conference (2017). She has many appreciation certificates and certificate of best presentation award at 19th International Conference on Environmental Pollution and Pollution Control, London, UK (ICEPPC 2017). Now she is a Head of Pharmacology and Toxicology Department at Al-Azhar University, Egypt.

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