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Parkinson's disease and Dementia: Induction and protection

Parkinson's disease (PD) is the second most common neurodegenerative disorder after Alzheimer's disease and no longer considered merely as a motor disorder where dementia may precede motor deficits and enhance their onset. Age is the most significant risk factor for the development of PD and dementia where oxidative stress increases during aging making the brain more susceptible to neurodegeneration. The exact underlying mechanism responsible for neurodegeneration progression still remains elusive and incompletely understood. Several epidemiological studies suggested that exposure to different environmental toxic agents and heavy metals increase the risk of induction and progression of neurodegenerative diseases. On the other hand, moderate cigarette smoking and coffee drinking are inversely associated with the risk of their development.

Animal models of Parkinson's disease and Dementia: Typically, animal models of PD include environmental neurotoxins or genetic models (PD-related mutations model). Metal ions play a crucial role in the development of PD and dementia; excessive manganese exposure has been associated with manganism while aluminum has been linked with Alzheimer's disease and dementia. Manganism is characterized by extrapyramidal symptoms resembling idiopathic PD as well as psychiatric and cognitive deficits. Rotenone, a naturally occurring insecticide, and pesticide have been also linked to the two pathological hallmarks occur in clinical PD (motor and non-motor symptoms), but high mortality rate represents the major limitation for this model. On the other hand, the use of genetic animal models and identification of disease-relevant genes can encourage search to discover new promising disease-modifying therapies.

Neuroprotection strategies of Parkinson's disease and Dementia: Dopamine deficiency plays the central role in the pathogenesis of PD, thus it represents the focus of treatment efforts. Other neurotransmitters also play a major role in controlling symptoms that related to cognitive behaviors, depression, anxiety, and dementia. Oxidative stress, inflammation, and apoptosis are considered the main mechanisms implicated in the degeneration of dopaminergic neurons. Protein malnutrition can predict the progression of neurodegeneration by increasing oxidative damage. In general, protection and early diagnosis still represent the cornerstone and the golden strategy in delaying or preventing the progression of age-dependent neurodegeneration. The most promising PD-modifying therapies include natural products and nutrients having powerful antioxidants, anti-inflammatory and antiapoptotic as well as those which promote neurotransmitters synthesis or enhance their concentration. Moreover, therapies which reduce stress, depression and promote better memory have also a significant role in delaying disease progression and in enhancing the efficacy of different treatments. On the other hand, non-drug therapies as physical training and mental activity can improve motor functions and manage non-motor symptoms.

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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