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Comparative Study on the Influence of Vinpocetine Alone or in Combination with different drugs against Aluminum-induced Alzheimer's disease in Rats

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Background: Alzheimer's disease (AD) is a progressive neurodegenerative disorder that accounts for the major cause of dementia in the world. It is pathologically characterized by deposition of β-amyloid (Aβ) peptides which influenced by oxidative stress and mitochondrial dysfunction. Vinpocetine increases cerebral blood flow, glucose uptake and has memory-enhancing properties. Epigallocatechin-3-gallate (EGCG) is a natural chelator and has health-promoting effects in CNS. Coenzyme Q10 (CoQ10) is an intracellular antioxidant and mitochondrial membrane stabilizer, while Vitamin E (VE) and Selenium (Se) are antioxidants and have ability to counteract free radicals.

Objective: To evaluate and compare the potential protective effects of Vinpocetine either alone or in combination with EGCG, CoQ10 or VE & Se against aluminum-induced AD in rats. Methods: Nine groups of rats were treated daily for four weeks with either saline for control group, AlCl3 (70 mg/kg I.P) for AD model group or received together with AlCl3 each of the following treatments: EGCG (10 mg/kg, I.P), CoQ10 (200mg/kg, P.O), VE (100 mg/kg, P.O) & Se (1 mg/kg, P.O) as well as Vinpocetine (20 mg/kg, P.O) either alone or in combination with each of them. Changes in brain Aβ, tau protein, ACHE, monoamins, inflammatory mediators, oxidative parameters as well as brain derived neurotrophic factor (BDNF) were measured. In addition, DNA fragmentation and Histopathological changes in different brain regions were also detected for all groups.

Results: Brain neurological damages characterizing AD rat's model were established. All treated groups showed different degrees of protection against hazards of AlCl3. Their protection was indicated by the significant decrease in Aβ, tau protein, ACHE, MDA, TNF-α, IL-1β together with the increase in SOD, TAC, monoamins, BDNF and confirmed by the histopathological examinations as well as the protection of DNA from fragmentation. Vinpocetine either alone or in combination with other treatments especially EGCG showed better results than each individual treatment.

Conclusion: Vinpocetine showed higher protection against AD induced by AlCl3 in rats than all other used individual treatments, but its combined therapy with these treatments especially with EGCG showed more pronounced protection.

Key words: Alzheimer's disease; Vinpocetine; Epigallocatechin-3-gallate; Coenzyme Q10; Vitamin E & Selenium; Rats

Speaker Biography

Prof. Azza A Ali has completed her PhD specialized in Pharmacology and Toxicology from Faculty of Pharmacy, Cairo University. Her postdoctoral studies included different scientific aspects related to her specialization field with giving especial interest to researches of neuropharmacology and psychopharmacology; she also developed research line of behavioral pharmacology in Egypt. She is member of many scientific societies in Egypt as well as of (AAPS) American Association of Pharmaceutical Scientists (2002) and (ISTAART) The Alzheimer's Association International Society to Advance Alzheimer's Research and Treatment (2016). She published more than 50 papers in reputed journals, supervised and discussed more than 80 PhD, MSc thesis and actively participated by oral and posters presentations at many international conferences especially on Alzheimer's disease & Dementia as Dementia 2015, 2016 and Alzheimer's Association International Conference (AAIC 2016). She has many appreciation certificates and certificate of best presentation award at 19th International Conference on Environmental Pollution and Pollution Control (ICEPPC 2017). Now she is a Head of Pharmacology and Toxicology Department at Al-Azhar University and she sacrifices great effort hoping to find real treatment that can prevent or delay the progression of Alzheimer's disease especially in the high-risk individuals focusing on depression, stress and malnutrition

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