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Study on Social Isolation as a Risk Factor in Alzheimer's disease

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Background: Alzheimer's disease (AD) is a neurodegenerative disease that leads to memory loss. It is characterized by deposition of Beta-amyloid peptides (Aβ), accumulation of neurofibrillary tangles and cell loss. Social isolation may exacerbate memory deficits. The risk of cognitive decline and the onset of AD may be lower by maintaining social connections and keeping mentally active. Relationship between frequent social activity and enhancing cognitive functions has been established.

Objective: To study the influence of complete social isolation for a long period on biochemical & histopathological changes and DNA fragmentation in the brain of normal rats as well as investigate the possible interaction between social isolation and development of AD using isolation-associated AD rat model.

Methods: Four groups of rats were used; 2 groups socialized and 2 isolated for four weeks. One of each socialized and isolated groups were served as control and the other (AD group) injected by ALCl3 (70mg/kg, IP) every day during four weeks of isolation or socialization. Isolated rats were housed individually in cages covered with black plastic while socialized rats were randomly paired and housed in transparent covered cages. Biochemical changes in the brain as acetyl cholinesterase (ACHE), Aβ, brain derived neurotrophic factor (BDNF), brain monoamins (Dopamine, Serotonin, Norepinephrine), inflammatory mediators (TNF-α, IL-1β), oxidative parameters (MDA, SOD, TAC) and DNA fragmentation were estimated for all groups. Histopathological changes in the brain were also evaluated.

Results: Complete social isolation for a long period resulted in brain neurological damage indicated by significant increase in Aβ, ACHE, MDA, TNF-α, IL-1β as well as decreases in SOD, TAC, BDNF, brain monoamins and confirmed by histopathological changes in different brain regions. In addition, isolation enhanced the DNA fragmentation induced by AD. Brain neurological damage was more severe in isolation-associated AD than in socialized condition.

Conclusion: Complete social isolation for a long period induces brain neuronal degenerations. It represents a risk factor especially when associated with AD; it increases DNA fragmentation and enhances the severity and progression of AD. Thus, socialization is advised especially with AD to avoid worsen or deterioration of the disease.

Biography

Azza A Ali has completed her PhD from Faculty of Pharmacy, Cairo University and postdoctoral studies from Faculty of Pharmacy, Al-Azhar University. She is the Head of Pharmacology and Toxicology Department, Al-Azhar University, Egypt. She has published more than 35 papers in reputed journals and developed research line in behavioral pharmacology in Egypt. She is member of many scientific societies in Egypt and of (AAPS) American Association of Pharmaceutical Scientists (2002). She is interested in CNS degenerations and disorders especially AD and dementia and has many researches and publications on its causes, prevention and risk factors especially stress and malnutrition. She is an Editorial Board Member at journal of Acta Psychopathologica.

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