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Poster Presentation

Vitamin D Administration, Cognitive Function, Blood Brain Barrier Permeability and Neuro-Inflammatory Factors in High-Fat Diet Induced Obese Rats

Ghazaleh Hajiluian[1*], Mahdieh Abbasalizad Farhangi[2], Ghazaleh Nameni[2], Parviz Shahabi[3], Mehran Mesgari-Abbasi[4]

[1]Department of Nutrition, School of Public Health, Iran University of Medical Sciences, Tehran, Iran
[2]Nutrition Research Center, Department of Community Nutrition, Tabriz University of Medical Sciences, Tabriz, Iran
[3]Department of Physiology, School of Medical Sciences, Tabriz University of Medical Sciences, Tabriz, Iran
[4]Drug Applied Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

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Abstract

Recently neuro-inflammation and cognitive impairment has attracted attention. It has been suggested that obesity lead to cognitive impairments induced by neuro-inflammatory markers like nuclear factor kappa B (NF-kB) and reduced neurotrophin factors like brain-derived neurotrophic factor (BDNF) in the hippocampus. Also, increased blood brain barrier (BBB) permeability. Because of the neuro-protective effects of vitamin D, we aimed to investigate the effects of vitamin D on cognitive function, NF-kB and BDNF concentrations in the hippocampus and BBB permeability high-fat diet induced obese rats. Forty male Wistar rats were fed either a control diet (CD) or high fat diet (HFD) for 16 weeks, then each group randomized in to two subgroups supplemented with vitamin D for 5 weeks. Morris Water Maze tes t was done at the 21st week to examine cognitive function, BBB permeability was characterized by measuring Evans blue dye in the hippocampus. Moreover, BDNF and NF- kB protein levels in the hippocampus. HFD significantly led to cognitive impairments, due to elevated NF-kB concentrations as neuroinflammatory factor (P=0.01) and reduction of BDNF (P=0.04) concentrations in the hippocampus. we showed that vitamin D supplementation in HFD group reduced body weight, NF- kB concentrations, BBB permeability (P=0.001 and P=0.03 respectively) and increased BDNF concentrations (P=0.002). Vitamin D reversed HFD induced cognitive impairments via reduction of the NF-kB, elevation in BDNF and modulation of BBB permeability in hippocampus, thus it can be considered as a beneficial therapeutic approach for prevention and treatment of neuroinflammation and cognitive deficits.

Keywords: Obese, Vitamin D, Blood Brain Barrier

Corresponding Author: Ghazaleh Hajiluian

Email: *LghazalehL@yahoo.com*

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