

The 2nd International Neuroinflammation Congress and 2nd Student Festival of Neuroscience



Shefa Neuroscience Research Center, Tehran, Iran, 17-19 April, 2018

The Neuroscience Journal of Shefaye Khatam

Volume 6, No. 2, Suppl 1

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 Farhangi², Ghazaleh Nameni², Parviz Shahabi³, Mehran Mesgari-Abbasi⁴

¹Department of Nutrition, School of Public Health, Iran University of Medical Sciences, Tehran, Iran

²Nutrition Research Center, Department of Community Nutrition, Tabriz University of Medical Sciences, Tabriz, Iran

³Department of Physiology, School of Medical Sciences, Tabriz University of Medical Sciences, Tabriz, Iran

⁴Drug Applied Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

Published: 17 April, 2018

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- κ B) 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- κ B 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 test 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- κ B protein levels in the hippocampus. HFD significantly led to cognitive impairments, due to elevated NF- κ B 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- κ B 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- κ B, 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