

Nikolac Perkovic, M., Borovečki, F., Filipčić, I., Klepac, N., Hajnšek S., Muck-Šeler, D., Pivac N. BDNF plasma levels and cognitive function in patients with Alzheimer's disease and mild cognitive impairment. Croatian Congress on Alzheimer's disease (CROCAD-14), Brela, Croatia, 1.-4.10.2014., Neurologia Croatica / Šimić, Goran ; Mimica, Ninoslav (ur.). - Zagreb : Denona d.o.o. , 2014. 34-34.

BDNF PLASMA LEVELS AND COGNITIVE FUNCTION IN PATIENTS WITH ALZHEIMER'S DISEASE AND MILD COGNITIVE IMPAIRMENT

Nikolac Perkovic M¹, Borovečki F², Filipčić I³, Klepac N⁴, Hajnšek S⁴, Muck-Šeler D¹, Pivac N¹

¹Division of Molecular Medicine, Rudjer Boskovic Institute, Bijenicka cesta 54, 10 000 Zagreb, Croatia;

²Department for Functional Genomics, Center for Translational and Clinical Research, University of Zagreb School of Medicine, and University Hospital Center Zagreb, Zagreb, Croatia;

³University Psychiatric Hospital "Sv Ivan", Zagreb, Croatia; ⁴Department of Neurology, University Clinical Hospital Center Zagreb, Zagreb University School of Medicine, Zagreb, Croatia

Introduction: Brain derived neurotrophic factor (BDNF) is an important member of neurotrophin family. Reduced BDNF concentration in different brain areas has been associated with dementia and cognitive decline. Since there is no cure for Alzheimer disease (AD), the studies of the early phases of AD have pointed out the importance of early detection of mild cognitive impairment (MCI). The aim of this study was to define the role of BDNF in the development of cognitive symptoms of dementia by analysing BDNF plasma concentration in patients with AD and MCI.

Methods: The study included 119 patients with AD and 50 patients with MCI, diagnosed according to NINCDS-ADRDA and DSM-IV criteria. Cognitive impairment was evaluated using Mini-Mental Status Examination (MMSE). Plasma BDNF levels were measured with enzyme-linked immunosorbent assay, according to the procedures supplied by the manufacturer (R&D Systems GmbH Wiesbaden-Nordenstadt, Germany). The association of plasma BDNF levels with cognitive decline was evaluated using Kruskal–Wallis one-way analysis of variance and Mann–Whitney U test.

Results: Our results showed no significant difference in plasma BDNF levels between patients with AD and MCI ($U=3453.5$; $P=0.100$). After dividing the patients with AD according to MMSE scores into patients with mild cognitive impairment (mild AD), moderate cognitive impairment (moderate AD), and severe cognitive impairment (severe AD), a significant ($H=6.59$; $df=2$; $P=0.037$) association between plasma BDNF levels and cognitive decline was detected, due to a significantly lower BDNF plasma levels in AD patients with severe cognitive impairment compared to patients with moderate and mild AD. After comparing the patients with MCI to AD patients, subdivided according to MMSE scores, a significant difference in plasma BDNF levels between these groups was confirmed ($H = 9.62$; $df=3$; $P = 0.022$).

Conclusion: In all analyses, patients with severe AD had significantly lower levels of plasma BDNF compared to other groups of patients. Results showed significant trend toward lower plasma BDNF concentration in patients with lower cognitive abilities and these results indicated a possible upregulation of BDNF in patients with mild AD, which may reflect a compensatory mechanism for beta-amyloid accumulation in this early stage of neurodegeneration.