

Nikolac Perković, M.; Borovečki, F.; Klepac, N.; Hajnšek, S.; Muck-Šeler, D.; Pivac, N. The association of BDNF polymorphisms and cognitive function in patients with Alzheimer's disease and mild cognitive impairment. SiNAPSA Neuroscience Conference '13 Book of Abstracts / Jeran, Judita ; Koritnik, Blaž (ur.). - Ljubljana : SiNAPSA, Slovenian Neuroscience Association , 2013. 67-67.

The association of BDNF polymorphisms and cognitive function in patients with Alzheimer's disease and mild cognitive impairment

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Brain derived neurotrophic factor (BDNF) is one of the key proteins involved in modulating neuronal survival, differentiation and synaptic plasticity in the brain. The reduction of the BDNF concentration in different brain areas has been associated with dementia and cognitive decline. The study investigated the association of the five BDNF polymorphisms, rs 6265 (Val66Met), rs11030104, rs7934165, rs1519480 and rs56164415 (C270T), with cognitive impairment. Eighty-two patients with Alzheimer's disease (AD) and 49 patients with mild cognitive impairment (MCI), which presents a high risk condition for AD, were included. Diagnosis of AD was done according to the NINCDS-ADRDA and DSM-IV criteria. Cognitive impairment was evaluated using Mini-Mental Status Examination (MMSE) and Clock Drawing Test (CDT). After subdividing the subjects according to the different BDNF variants, association between rs1519480 and MMSE scores in patients with AD ($F=3.856$; $P=0.025$) and MCI ($F=3.270$; $P=0.047$) was found. There was a marginal association of MMSE scores with C270T polymorphism in patients with AD ($F=3.697$; $P=0.058$). Similar results were obtained using CDT scores to predicts person's cognitive abilities, showing that AD patients differed significantly ($F=4.666$; $P=0.034$) in CDT scores when subdivided according to the rs1519480 genotype, while this association was marginally significant in individuals with MCI ($F=3.904$; $P=0.054$). We have also found an association of rs11030104 with CDT scores in AD ($F=5.495$; $P=0.022$). Other analysed polymorphisms were not significantly associated with MMSE or CDT scores. These results reveal that BDNF rs1519480 and rs11030104 polymorphisms were significantly associated with cognitive decline in patients with AD or MCI.