ДНС Друштво за неуронауке Србије
SNS Serbian Neuroscience Society

САНУ Српска академија наука и уметности

INTERNATIONAL BRAIN IBRO RESEARCH ORGANIZATION

7th CONGRESS OF SERBIAN NEUROSCIENCE SOCIETY
with international participation

BOOK OF ABSTRACTS

Belgrade
October 25-27, 2017.

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Effects of macrophage migration inhibitory factor deficiency and fructose-enricheddieton systemic and hippocampal insulin sensitivity, behavior andhippocampal plasticity in male mice

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Introduction. The macrophage migration inhibitory factor (MIF) is involved in the regulation of glucose metabolism in the hippocampus, while fructose overconsumption has been associated with changes in hippocampal insulin sensitivity and synaptic plasticity, resulting in disturbances in learning and memory. Therefore, we hypothesized that MIF defficiency in combination withfructose diet (FD) may affect insulin sensitivity and hippocampal synaptic plasticity, thus leading to behavioral changes. **Methods.** The effects of 9-week 20% FDon energy intake andinsulin sensitivity in wild type (WT) and MIF deficient ($MIF^{-/-}$) C57Bl/6J male micewere analyzed. Inhibitory Ser^{307} phosphorylation of insulin receptor substrate 1 (IRS-1) was used as hallmark of hippocampal insulin resistance. Novel object recognition test (NOR) was used to assess exploratory behavior.Synaptic plasticity was estimated by polysialylated-neural cell adhesion molecule (PSA-NCAM) protein level. **Results.** WT and $MIF^{-/-}$ mice on fructose diet had increased energy intake, whilesystemicinsulin sensitivity was disturbed in all $MIF^{-/-}$mice. Hippocampal pIRS-1 Ser^{307} was elevated in all animals compared to WT on standard diet (SD).$MIF^{-/-}$ animals on SD showed impaired recognition memory in NOR. Finally, although PSA-NCAM was decreased in WT animalson FD and $MIF^{-/-}$on SD, its level in fructose-fed $MIF^{-/-}$mice was the same as in the WT on SD. **Conclusion.** Thesepreliminary resultsshow thatboth MIF defficiency and fructose caloric overloadare implicatedin impairment ofsystemic and hippocampal insulin sensitivity. However, behavioral changes observed in $MIF^{-/-}$mice were normalized after fructose feeding, which coincided with the changes in synaptosomal PSA-NCAM protein level.

Acknowledgements. This study was supported by the grant No. III41009 from the Ministry of Education, Science and Technological Development, Republic of Serbia