Reichmann *et al.: Intrinsic Activity*, 2015; **3**(Suppl. 2):A2.6
http://www.intrinsicactivity.org/2015/3/S2/A2.6
published online: 9 September 2015

21st Scientific Symposium of the Austrian Pharmacological Society: Joint Meeting with the British Pharmacological Society and the Pharmacological Societies of Croatia, Serbia and Slovenia

Graz, 16–18 September 2015

MEETING ABSTRACT

A2.6

Neuropeptide Y knockout alters behavioural effects of environmental enrichment

Florian REICHMANN[1,*], Ahmed M. HASSAN[1], Herbert HERZOG[2] and Peter HOLZER[1]

[1]Research Unit of Translational Neurogastroenterology, Institute of Experimental and Clinical Pharmacology, Medical University of Graz, Austria; [2]Neuroscience Division, Garvan Institute of Medical Research, Sidney, Australia

Background: Environmental enrichment (EE), an improved laboratory housing condition to enhance rodent welfare, reduces anxiety and facilitates stress coping of mice. Neuropeptide Y (NPY), a key peptide for the processing of stress, has similar behavioural effects. Given these resemblances, the current work investigated the role of NPY in the behavioural effects of EE.

Methods: The behavioural phenotype of wild-type (WT) and NPY knockout (NPY KO) mice housed either under standard environment (SE) or EE was assessed in various behavioural tasks. After a 9-week differential housing period anxiety was evaluated with the elevated plus maze (EPM) and the open field test (OF), while stress coping and depression-like behaviour was measured with the stress-induced hyperthermia test (SIH) and the forced swim test (FST), respectively. One day after the last behavioural test NPY levels in the amygdala and hippocampus were measured by PCR and ELISA.

Results: NPY KO abolished the EE-induced anxiolytic effect in the EPM. In particular, EE-housed WT mice made significantly more entries to the open arms of the EPM compared to SE-housed WT mice, an effect not seen in NPY KO mice. In contrast, anxiety, locomotor and depression-like behaviour in the OF and the FST were influenced by genotype, but not housing condition. NPY KOs showed increased anxiety, reduced locomotor activity and enhanced depression-like behaviour independent of housing conditions. Housing itself did however affect climbing behaviour during the FST as both EE-housed WTs and NPY KOs spent more time climbing. The SIH suggested a negative effect of EE for NPY KOs as EE-housed NPY KOs had higher stress-induced rectal temperatures compared to SE-housed NPY KOs. Increased EE-induced amygdalar and hippocampal NPY gene expression in WT mice also suggests an interaction between NPY and EE. The corresponding NPY peptide levels did not differ between the groups indicating enhanced NPY turnover in EE-housed mice.

Discussion: The current molecular and behavioural data favour the contention that NPY contributes to the anxiolytic effects of EE. The absence of NPY abolishes this beneficial effect and even induces negative effects in response to environmental stimulation.

Acknowledgements: Supported by the Austrian Science Fund (FWF grant P25912-B23).

*Corresponding author e-mail: *florian.reichmann@medunigraz.at*