

# Abstract for BENEFRI WORKSHOP 2013

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## Title: Phenotyping of PV-Cre/VGlut2-Lox Mice

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We are currently investigating the function of a newly detected nucleus (PV1, as its neurons express parvalbumin [PV]) in the ventrolateral tuberal hypothalamus of mice and rats. Based on its location within the medial forebrain bundle as well as on its projection into the ventrolateral periaqueductal grey (PAG, unpublished findings of our group), we hypothesize an involvement of PV1 in the regulation of either the expression of emotions (vocalizations), pain or blood pressure. Unlike most other parvalbumin expressing neurons in the brain that are GABA-ergic, the PV1 neurons have been shown to express glutamate<sup>1</sup>. Due to this fact, a mouse strain in which the vesicular glutamate transporter 2 (VGlut2) was selectively inactivated in parvalbumin expressing neurons (PV-Cre VGlut2-Lox) has the potential to provide information on behaviors mediated by PV1.

Results of this pilot study demonstrate reduced social interaction as well as reduced vocalization rates in dyadic interactions of the homozygous PV Cre/Cre VGlut2 Lox/Lox mice as compared to their heterozygous and PV +/+ VGlut2 Lox/Lox controls. Furthermore, mice lacking VGlut2 in parvalbumin positive neurons seem to be less sensitive towards pain (Hot Plate Test) and to build less sophisticated nests than controls.

It is well accepted that certain aspects of rodent ultrasonic vocalizations reflect emotional or motivational states<sup>2</sup>. In addition, vocalization rates during dyadic interactions of females have been positively correlated with social investigation such as anogenital sniffing<sup>3</sup>. Our preliminary results thus suggest a social abnormality and changes in emotional expression in PV Cre/Cre VGlut2 Lox/Lox mice. In addition, they point out a difference in pain sensitivity and possibly also in motivation between genotypes. The experiments are now being expanded and might help reveal the role of the hypothalamic PV1 nucleus in the context of expression of positive emotions.

1 Meszar, Z., F. Girard, et al. (2012). "The lateral hypothalamic parvalbumin-immunoreactive (PV1) nucleus in rodents." *The Journal of comparative neurology* 520(4): 798-815.

2 Lahvis, G. P., E. Alleva, et al. (2011). "Translating mouse vocalizations: prosody and frequency modulation." *Genes, brain, and behavior* 10(1): 4-16.

3 Moles, A., F. Costantini, et al. (2007). "Ultrasonic vocalizations emitted during dyadic interactions in female mice: a possible index of sociability?" *Behavioural brain research* 182(2): 223-230.