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INTRINSIC ACTIVITY

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MEETING ABSTRACT

A3.35

Characterization of neurokinin B neurons of the bed nucleus of the stria terminalis and elucidating their role in metabolic and emotional processing

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Background: The bed nucleus of the stria terminalis (BNST) is a center of integration for limbic information and valence monitoring. Neurons within the BNST are capable of modulating aversive and appetitive behaviors. The BNST is also a rich source of distinct neuronal subpopulations containing various neurotransmitters, neuropeptides and their receptors. Neurokinin B (NKB) is one such neuropeptide, which is highly expressed in the BNST. Our focus is to characterize this subpopulation of NKB neurons and to elucidate their role in metabolic and fear processing.

Methods: Dual immunohistochemical, *in situ* hybridization and neuronal tract tracing techniques were used to characterize and map the elaborated axonal network of BNST NKB neurons. Experimental mice were exposed to various environmental challenges such as sustained fear conditioning or short-term fasting. Interaction of BNST NKB neurons with their major projection targets was studied by combining immediate early gene c-Fos immunolabelling and retrograde tracing techniques. A modulatory role of BNST NKB neurons during metabolic challenge were identified through chemogenetic stimulation of NKB neurons in transgenic Tac2cre mice.

Results: NKB neurons and their fibers were preferentially found in the dorsolateral nuclei of the BNST. Neurochemical characterization showed that about 60% of these neurons also co-express calretinin. NKB-expressing BNST efferents majorly target the periaqueductal gray (PAG), lateral hypothalamus, central medial amygdala and ventral tegmental area. Hence, they could modulate various metabolic and behavioral functions. For instance, we identified that about one third of posterior BNST neurons which are activated by sustained fear response are projecting to the ventrolateral PAG.

Discussion: The results suggest that the BNST NKB neurons targeting the PAG are involved in sustained fear processing. Next, we would explore these neuronal ensembles in more detail, in terms of neurochemical, cellular as well as metabolic and fear-associated behavioral properties.

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