

LATERAL SEPTAL CALBINDIN NEURONS REGULATE MATERNAL BEHAVIOUR

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The lateral septum (LS) is supposed to have a role in maternal behaviour based on lesion studies, however, the responsible cellular networks are unknown yet. We aimed to characterize maternally activated septal neurons and their function in maternal regulation. We established that all pup-induced c-Fos+ septal neurons are inhibitory GABAergic neurons. Some of these neurons in the ventral subdivision of the LS (LSv) contain calbindin (Cb+). The number of c-Fos-activated Cb+ neurons was markedly higher in mothers following pup-exposure than pup deprivation. Functional investigation of LS Cb+ neurons in Cb-Cre mice demonstrated, the inhibition of these neurons reduced the time spent with the licking of the pups, but caused no other behavioural effects. We demonstrated Cb+ LSv neurons send projection to the medial preoptic area (MPOA) a centre for regulating maternal behaviour. Furthermore, we established that Cb+ LSv neurons contain receptors of the maternally induced neuropeptide, parathyroid hormone 2 (PTH2). We also identified PTH2+ terminals around Cb+ neurons in the LSv. Moreover, synaptic connection was established between PTH2+ fibres and maternally activated inhibitory septal neurons. These PTH2+ terminals might arrive from the PTH2+ neurons located in the posterior intralaminar thalamic nucleus (PIL), which all show c-Fos-activation in mothers following pup-exposure compared to pup-deprived controls. We conclude that the activation of the inhibitory Cb+ neurons mediated by PTH2 is required for the pup licking behaviour, which may be executed by their projection to the MPOA neurons.

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