



# ABSTRACT BOOK

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## P4.08 Septal-preoptic connectivity and their thalamic input in suckling rats

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Mothers have to deal with a combination of sensory cues from the pups which has to be processed by numerous brain regions by forming a complex integrative neural circuit. We aimed to reveal the mainly implicated brain regions and their relation in the regulation of maternal care in a histological approach. First, we determined that the highest level of suckling-induced activation occurs in the medial preoptic area (MPOA) and the ventral part of lateral septum (LSv) in rat dams. Although, the MPOA is a well-known area which controls maternal care, little is known about the involvement of the LSv. First, we addressed to reveal the effect of cue modality from the pups on the septal activation. We used pup-deprivation method in rat mothers and confirmed that the level of activated neurons was significantly lower in those dams who received only pup-related vocal, visual and olfactory but not physical stimuli compared to suckling mothers, but still elevated when compared to totally pup-deprived mothers. As the highest activation is attributed to suckling, we addressed to reveal LSv input brain regions implicated in somatosensory processing. We used retrograde tract tracing and found that maternally-activated neurons of the posterior intralaminar thalamic nucleus (PIL), which has been shown to participate in touch-related stimuli processing among adult conspecifics, send projection to LSv neurons. Moreover, PIL neurons are known to express a suckling-induced neuropeptide, parathyroid hormone 2 (PTH2), thus we supposed PTH2 action on septal neurons. We showed that PTH2+ terminals form synaptic connection with activated LSv neurons. LSv projection of PTH2+ PIL fibers was confirmed by using distinct pathway tracing methods combined with immunohistochemistry in suckling dams. Furthermore, we defined that maternally activated septal neurons send the most prominent projection to the MPOA, which also receives PTH2+ PIL neuronal projection. Based on these, we investigated and showed that the same neurons of the PIL project to both LSv and MPOA neurons, which raises the possibility of their simultaneous regulation by PTH2 signal. We further found PTH2+ terminals in close vicinity of MPOA-projecting LSv and LSv-projecting MPOA neurons. In conclusion, these data indicate that the LSv and MPOA compose a subcircuit in maternal brain network and may transfer the stimulatory signal of the pups from PIL PTH2+ neurons thereby contributing to maternal behaviour.

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