

7th Hungarian Neuroscience Meeting for Undergraduate Students, Graduate Students and Young Postdocs

24th January, 2024, Pécs



<https://hundoc2024.mitt.hu/invitation>



Endre Grastyán theoretical building of the Medical School - University of Pécs
(Pécs, Szigeti u. 12, 7624)

7th Hungarian Neuroscience Meeting for Undergraduate Students, Graduate Students and Young Postdocs

Invitation

Dear Colleagues,

The 7th Hungarian Neuroscience Doctoral Conference for Undergraduate Students, Graduate Students and Junior Post-Docs (HUNDOC) will be held on the 24th of January. Similarly to previous years, it will be held the day before the International Neuroscience Workshop. Registration is separate and it is free of charge for MITT members who paid their annual fees (2000 HUF for students and 4000 HUF for postdocs) by November 15th. Non-members are asked to pay a registration fee (15 000 HUF).

We would like to welcome undergraduates, PhD students and junior post-docs to share their research at an open, stimulating and motivational forum. It'll be a fun day filled with good company, elevating speeches, and workshops and most of all fascinating science in the lively and lovely city of Pécs. Just like in previous HuNDoC conferences, we expect high number of young researchers. The HuNDoC conference will provide the catering and amazing programs, such as an open discussion with one of the greatest Hungarian neuroscientists, Prof. György Buzsáki. In the evening there will be a social event to further discuss and reflect on the happenings of the day (for further details, please see the program)

Every participant is required to submit an abstract, however ongoing projects are also welcome. Your results are expected to be presented in the form of an A4 Mini poster, with the possibility of being chosen to present your work in a short talk (10 min talk with 5 min discussion time) if you're interested.

We hope to see you there!

Any further questions, please do not hesitate to contact us at hundoc2024@gmail.com.

The organizing committee:

Barbara Fülöp, Department of Pharmacology and Pharmacotherapy, Medical School, University of Pécs

Szilárd Szőcs, Department of Physiology, Medical School, University of Pécs

Gergely Szarka, Department of Neurobiology, Faculty of Natural Sciences, University of Pécs



91. Szendi, Vivien

Calbindin neurons of the lateral septum control maternal behaviour via a thalamic-septal-hypothalamic circuit

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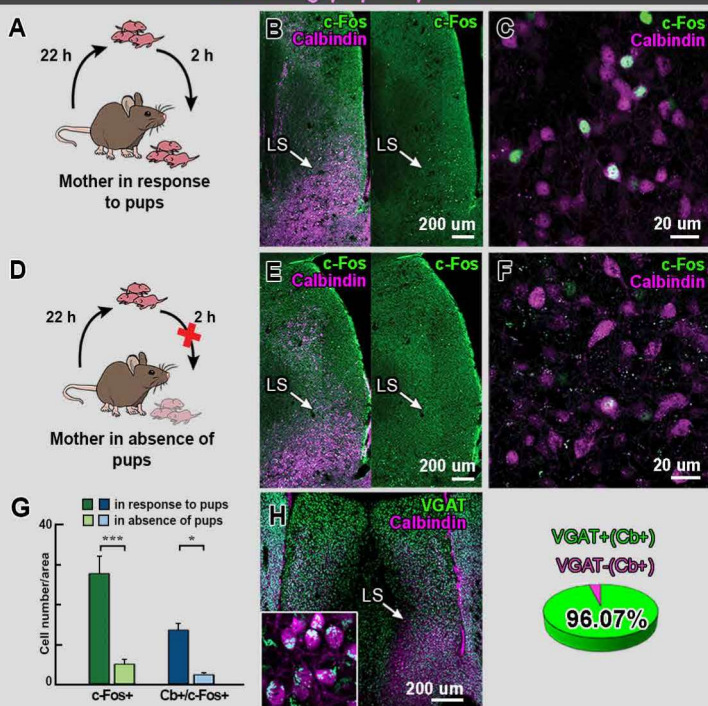
The lateral septum (LS) is a forebrain area that has a role in forming prosocial behavioural elements such as maternal care. LS is supposed to have a role in maternal behaviour based on lesion studies, however, the responsible cellular networks are not known yet. Therefore, we aimed to characterize maternally activated septal neurons and their function in maternal regulation. First, we established that all of the pup-induced c-Fos+ septal neurons are inhibitory GABAergic neurons. A population of these GABAergic 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. We demonstrated by viral based, cell type-specific anterograde tracing that Cb+ LSv neurons send massive projection to the medial preoptic area (MPOA) a centre for regulating maternal behaviour and confirmed this projection by retrograde tracing. To establish how maternal input arrives at the Cb+ LSv neurons, we first established that these neurons contain receptors of the maternally induced neuropeptide, parathyroid hormone 2 (PTH2) using Cb immunolabelling in reporter mice expressing ZsGreen in PTH2 receptor-expressing neurons. These receptors are likely activated by PTH2 released from the PTH2 terminals we also identified around Cb+ neurons in the LSv. Moreover, a synaptic connection was established between PTH2+ fibres and maternally activated inhibitory neurons in the LSv using electron microscopy. We also demonstrated that PTH2+ fibers in the LSv originate in the posterior intralaminar thalamic nucleus (PIL) from PTH2+ neurons, which all show c-Fos-activation in mothers following pup exposure compared to pup-deprived controls. The MPOA also receives PTH2+ input from PIL, thus we investigated and showed that the same neurons of the PIL project to both LSv and MPOA neurons. Functional investigation of LS Cb+ neurons in Cb-Cre mice demonstrated that the inhibition of these neurons reduced the time spent with the licking of the pups but caused no other behavioural effects. Therefore, we conclude that the activation of the inhibitory Cb+ neurons is required for the pup licking behaviour, which may be executed by their projection to the MPOA neurons. These data indicate that the LSv and MPOA form an interconnected subcircuit driven by somatosensory input from the pups via the PIL PTH2+ neurons in maternal brain.

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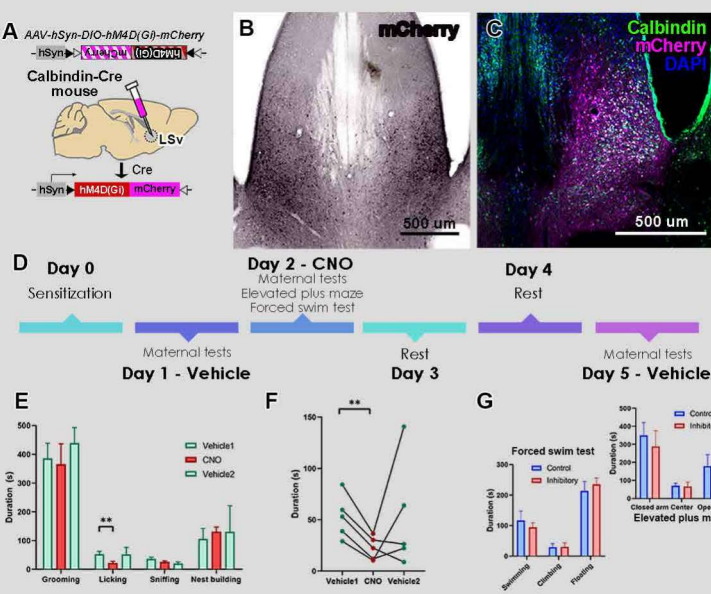
Introduction

Maternal care is regulated by a complex neural network, which includes the **lateral septum (LS)**. LS has prominent connection with different brain regions involved maternal regulation including the **medial preoptic area (MPOA)**, a well established brain site driving maternal motivation. LS contains an elevated number of activated neurons in lactating rodents following pup exposure. However, the cell types of LS participating in the control of maternal behaviours, and the inputs, which activate LS neurons by pup exposure are unknown. Our research group previously described that neurons in the **posterior intralaminar thalamic nucleus (PIL)** express an excitatory neuropeptide, **parathyroid hormone 2 (PTH2)**, whose expression is induced in mothers. Dense PTH2+ fibre network can be found in the LS, as well. We hypothesize that the LS contains specific cell types taking part in maternal adaptation via their projection to the MPOA driven by the PTH2+ pathway originated from the PIL.

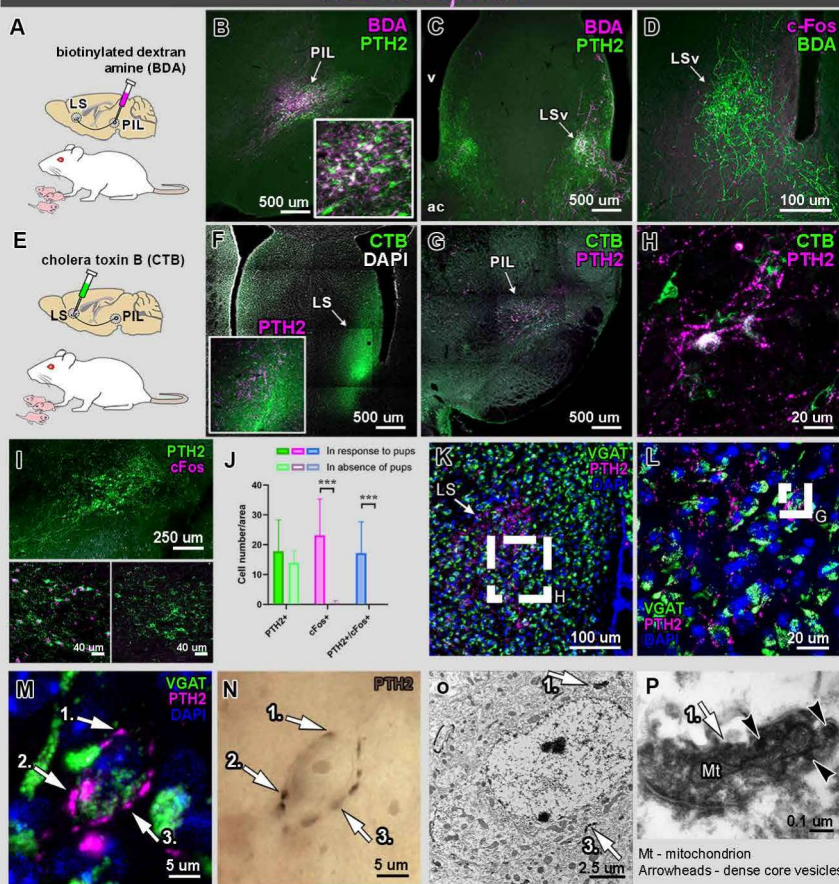
1. Lateral septal calbindin neurons in the maternal brain following pup-exposure



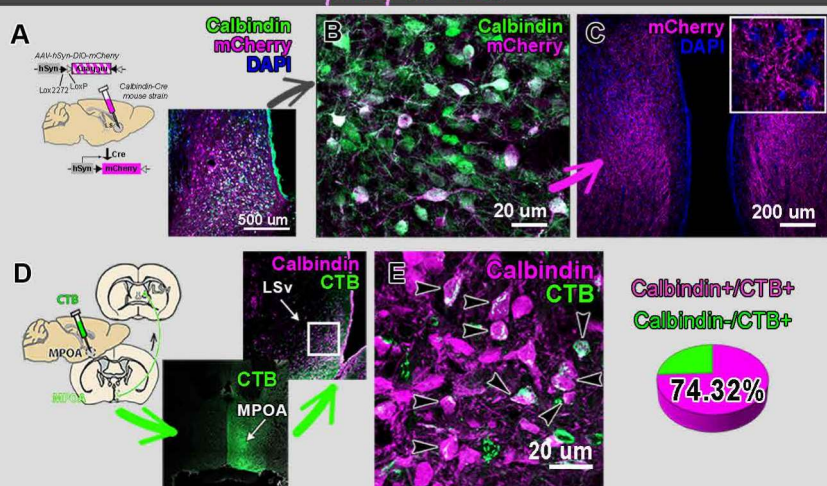
2. Inhibition of calbindin neurons reduces maternal licking behaviour



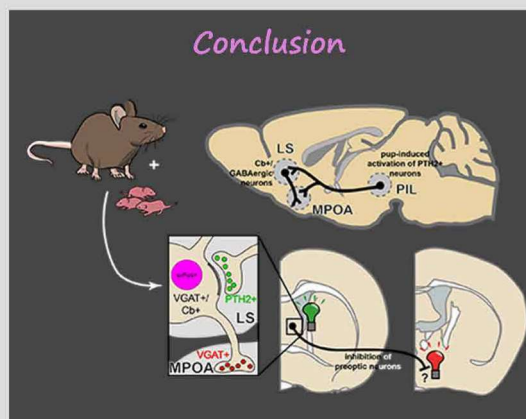
3. The localization of PTH2R and PTH2+ fibres in the lateral septum



4. Lateral septal calbindin neurons project to the medial preoptic area



Conclusion



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