

# OKLEVÉL

*Bolyai Kollégium Különdíj*

*Egyed Máté*

*része*

*Az ELTE Biológus Tudományos Diákkör 2024. november 30-án  
megrendezett konferenciáján bemutatott kiemelkedő előadásáért.*

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# ABSZTRAKTKÖTET



## Konferencia

2024. november 30., szombat



## Bautista Soldevila Áron

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### **The Function of Brain Lateralisation in Drosophila Decision Making**

In *Drosophila melanogaster*, a central brain circuit tracks the animal's internal state and controls sugar choice when the fly is hungry. In this state, the flies will prefer fructose, which serves as a signal for the flies to eat more. One of its parts, the SAuni neurons innervate the AB neuropil only in the right hemisphere in most of the wild type brains. They have been described as necessary for the formation of fructose preference, but nothing is known if asymmetric SAuni neuron innervation is critical for decision making in feeding behaviour [1]. We aimed at finding out how laterality will affect the circuit's functionality by comparing food preference of wild type *Drosophila* flies with asymmetrical brains with mutant lines in which central brain asymmetry is reduced. We knocked down *unc5*, as it has been described to decrease laterality, and used a *wnt4* mutant which also had the same effect [2].

References: [1] P.-Y. Musso, P. Junca, and M. D. Gordon, 'A neural circuit linking two sugar sensors regulates satiety-dependent fructose drive in *Drosophila*', *Sci. Adv.*, vol. 7, no. 49, p. eabj0186, 2021, doi: 10.1126/sciadv.abj0186.

[2] F. Lapraz et al., 'Asymmetric activity of NetrinB controls laterality of the *Drosophila* brain', *Nat. Commun.*, vol. 14, no. 1, Art. no. 1, Feb. 2023, doi: 10.1038/s41467-023-36644-4.

*Supervisor: Prof. Dr. Thomas Hummel, University of Vienna, full professor*

## Egyed Máté

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### **Oxytocin receptor-expressing neurons in the medial preoptic area affect social behaviour**

Oxytocin (OT) is known to affect emotional behaviour via the oxytocin receptor (OTR) located in several forebrain regions. Recent evidence suggests that the medial preoptic area (MPOA), located in the anterior part of the hypothalamus, is involved in the control of affiliative social behaviour. Since OTR is abundant in the MPOA, we hypothesised that OTR-expressing neurons in the MPOA regulate social behaviour in rodents. To address this question, I aimed to investigate the functional role of OTR neurons in interfemale social behaviour by chemogenetic manipulation. I selectively stimulated MPOA OTR neurons in transgenic rats expressing Cre recombinase in these cells by injecting a viral vector expressing the excitatory designer receptor in a Cre-dependent manner. Stimulation of these receptors by exogenous ligand led to a significant increase in the time spent with several social behavioural elements without altering the animals' sociability, social preference, depression and anxiety-like behaviours. Neuronal tracing revealed that OTR neurons project to brain regions, such as the periaqueductal grey matter and lateral septum that control social behaviour suggesting that these targets of MPOA OTR neurons might mediate the actions. In addition, I also found using fibre photometry, that OTR neurons in the MPOA are activated during anogenital sniffing and chasing. These data suggest that MPOA OTR-expressing neurons affect social interactions between adult female conspecifics.

*Supervisors: Dr. Gina Puska: University of Veterinary Medicine Budapest, Department of Zoology, assistant professor; Prof. Dr. Árpád Dobolyi, ELTE Department of Physiology and Neurobiology, full professor*

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