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RESEARCH AREA

We are interested in the neural basis of cognitive functions both in the normal and diseased brain. We are investigating how different neuron types of subcortical centres mediate cognitive processes such as attention, learning and memory. Cholinergic neurons have been associated with learning and other cognitive functions; however, their activity during behavior is unknown. Understanding how the activity of basal forebrain cholinergic neurons support learning as well as how their impairment leads to learning deficits can help understanding their role in neurodegenerative dementias. Intermingled with cholinergic neurons, the basal forebrain also contains cortically projecting long-range inhibitory neurons. To understand how the basal forebrain supports cognition, it is important to determine how cognitive functions associated with the basal forebrain are segregated among different cell types.

TECHNIQUES AVAILABLE IN THE LAB

Mouse experiments, animal handling, electrophysiology, fiber photometry, optogenetic manipulations, human EEG analysis.

SELECTED PUBLICATIONS

Hegedüs, P., Heckenast, J., **Hangya, B.** (2021) Differential recruitment of ventral pallidal e-types by behaviorally salient stimuli during Pavlovian conditioning. **iScience** **24**: 102377.

Király, B., Balázsfi, D., Horváth, I., Solari, N., Sviatkó, K., Lengyel, K., Birtalan, E., Babos, M., Bagaméry, G., Máthé, D., Szigeti, K., **Hangya, B.** (2020) In Vivo Localization of Chronically Implanted Electrodes and Optic Fibers in Mice. **Nat Comm** **11**: 4686.

Laszlovszky, T., Schlingloff, D., Hegedüs, P., Freund, T.F., Gulyás, A., Kepecs, A., **Hangya, B.** (2020) Distinct synchronization, cortical coupling and behavioral function of two basal forebrain cholinergic neuron types. **Nat Neurosci** **23**: 992-1003.

Hangya, B., Ranade, S.P., Lorenc, M., Kepecs, A. (2015) Central cholinergic neurons are rapidly recruited by reinforcement feedback. **Cell** **162**: 1155–1168.

Pi, H.J., **Hangya, B.**, Kvitsiani, D., Sanders, J.I., Huang, Z.J., Kepecs, A. (2013) Cortical interneurons that specialize in disinhibitory control. **Nature** **503**: 521-524.