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RESEARCH AREA

The main goal of the research group is to study the expression and function of transient receptor potential (TRP) ion channels in the brain. The TRP ion channel family includes 28 members in mammals. The understanding of TRP ion channels was made possible by research on TRPV1, TRPA1 and TRPM8 channels located on peripheral nerve endings. These classic receptors play a role in cold and hot sensation, inflammatory pain sensation, but also, for example, in sensing the pungency of chili peppers. However, the expression and function of TRP ion channels in the brain is still a debate, especially regarding the expression pattern at the cellular level. Our research focuses on neurons expressing TRP ion channels from different brain areas, including the hippocampus, the amygdala and the piriform cortex.

TECHNIQUES AVAILABLE IN THE LAB

We use cutting edge experimental techniques to investigate the role of these ion channels. Including in vitro and in vivo electrophysiological techniques, in vivo Ca2+ imaging, immunohistochemistry and behavioral experiments.

SELECTED PUBLICATIONS

Mundrucz, L., Kecskés, A., Henn-Mike, N., Kóbor, P., Buzás, P., Vennekens, R., **Kecskés, M.** (2023) TRPM4 regulates hilar mossy cell loss in temporal lobe epilepsy. **BMC Biol 26:** 96.

Al-Omari, A.*, **Kecskés, M.***, Gaszner, B., Biró-Sütő, T., Fazekas, B., Berta, G., Kuzma, M., Pintér, E., Kormos, V. (2023) Functionally active TRPA1 ion channel is downregulated in peptidergic neurons of the Edinger-Westphal nucleus upon acute alcohol exposure. **Front Cell Dev Biol 10:** 1046559.

Vandewiele, F., Pironet, A., Jacobs, G., **Kecskés, M.,** Wegener, J., Kerselaers, S., Hendrikx, L., Verelst, J., Philippaert, K., Oosterlinck, W., Segal, A., Van Den, Broeck., Pinto, S., Priori, S.G., Lehnart, S.E., Nilius, B., Voets, T., Vennekens, R. (2022) TRPM4 inhibition by meclofenamate suppresses Ca2+-dependent triggered arrhythmias. **Eur Heart J 43:** 4195-4207.

Kecskés, A., Czéh, B., Kecskés, M. (2022) Mossy cells of the dentate gyrus: Drivers or inhibitors of epileptic seizures? **Biochim Biophys Acta Mol Cell Res. 1869:** 119279.

Kecskés, M.*, Henn-Mike, N.*, Agócs-Laboda, Á., Szőcs, S., Petykó, Z., Varga, C. (2020) Somatostatin expressing GABAergic interneurons in the medial entorhinal cortex preferentially inhibit layerIII-V pyramidal cells. **Commun Biol 3:** 754.