

ZSOLT LELE



Institute of Experimental Medicine
Molecular Neurobiology Research Group

Address: Szigyony u. 43., H-1083 Budapest, Hungary

RESEARCH AREA

The Laboratory of Molecular Neurobiology has 3 major projects running currently. 1.) Development and novel application of the PharmacoSTORM superresolution microscopy. 2.) The role of endocannabinoid synthesizing enzymes in the development of the central nervous system. 3.) The role of cadherin cell adhesion molecules in cortical development. Of these, the second and the third projects are under my supervision. Endocannabinoids are endogenous molecules which bind to the same receptor which Δ^9 -tetrahydrocannabinol, the main psychoactive component of marijuana targets. Currently there are two main endocannabinoids anandamide and 2-AG although there are several more or less uncharacterized lipids which may belong to this category. Synthesis of these signalling molecules can occur via many pathways, at least based on biochemical and in vitro cell culture experiments. Our main targets are the potential alternative synthesizing enzymes of anandamide, and we aim to characterize their role in the development of the CNS. The other project focuses on cadherins (Ca²⁺-dependent adhesion molecules) and their role in cortical development. Of the more than 100 members of the cadherin superfamily our lab focuses on the classic (ie. β -catenin-binding) cadherin family. One of our main projects is actually at the crossing point of these projects where we recently described a novel protecting mechanism in the developing embryonic cortex which we termed developmental anoikis. Our main goal is currently to describe the molecular mechanisms behind this phenomenon.

TECHNIQUES AVAILABLE IN THE LAB

A wide spectrum of anatomical and molecular biology techniques can be mastered in our laboratory from basic cloning techniques to the use of state-of the art superresolution microscopes. These include but are not limited to PCR-based and classic cloning, site-directed mutagenesis, traditional chromogenic and fluorescent RNAScope in situ hybridization, immunohistochemistry, cell

culture techniques, Western-blot, mousekeeping, breeding and genotyping techniques, in vivo gene transfer methods including in utero electroporation. Traditional and confocal light microscopy, STORM superresolution microscopy.

SELECTED PUBLICATIONS

László, Z.I., **Lele, Z.**, Zöldi, M., Miczán, V., Mógor, F., Simon, G.M., Mackie, K., Kacs Kovics, I., Cravatt, B.F., Katona, I. (2020) ABHD4-dependent developmental anoikis safeguards the embryonic brain. **Nat Commun** 11: 4363.

Cserép, C., Posfai, B., Lenart, N., Fekete, R., Laszlo, Z.I., **Lele, Z.**, Orsolits, B., Molnar, G., Heindl, S., Schwarcz, A.D. et al. (2020) Microglia monitor and protect neuronal function through specialized somatic purinergic junctions. **Science** 367: 528-537.

László, Z.I., Bercsényi, K., Mayer, M., Lefkovich, K., Szabó, G., Katona, I., **Lele, Z.** (2020) N-cadherin (Cdh2) Maintains Migration and Postmitotic Survival of Cortical Interneuron Precursors in a Cell-Type-Specific Manner. **Cereb Cortex** 30: 1318-1329.

Klinger-Gratz, P.P., Ralvenius, W.T., Neumann, E., Kato, A., Nyilas, R., **Lele, Z.**, Katona, I., Zeilhofer, H.U. (2018) Acetaminophen Relieves Inflammatory Pain through CB1 Cannabinoid Receptors in the Rostral Ventromedial Medulla. **J Neurosci** 38: 322-334.

Lefkovich, K., Mayer, M., Bercsenyi, K., Szabo, G., **Lele, Z.** (2012) Comparative analysis of type II classic cadherin mRNA distribution patterns in the developing and adult mouse somatosensory cortex and hippocampus suggests significant functional redundancy. **J Comp Neurol** 520: 1387-1405.