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RESEARCH AREA

Our aim is the better understanding of cognitive processes such as learning, attention and the formation of memory. The many neurons in our brain can interact with each other and thus communicate with each other with various so-called neuromodulators. The mediated information is essential for the healthy course of cognitive processes. Such important neuromodulatory systems are the dopaminergic system, the cholinergic system, the noradrenergic system and the serotonergic system. These neuromodulatory systems are implicated in almost all dementia-related or mental illnesses. In our experiments, we investigate the role of these neuromodulatory systems in the course of learning in healthy and diseased brain.

TECHNIQUES AVAILABLE IN THE LAB

We train mice various tasks based on associative conditioning during our experiments, while using various methods to monitor and record what is happening in their brains, so we perform electrophysiological measurements, fiber photometry measurements, and optogenetic manipulations.

SELECTED PUBLICATIONS

Szabó Í, Varga VÉ, Dvoráckó S, Farkas AE, Körmöczi T, Berkecz R, Kecskés S, Menyhárt Á, Frank R, Hantosi D, Cozzi NV, Frecska E, Tömböly C, Krizbai IA, Bari F, Farkas E. (2021) N,N-Dimethyltryptamine attenuates spreading depolarization and restrains neurodegeneration by sigma-1 receptor activation in the ischemic rat brain. **Neuropharmacology** **192**: 108612.

Körmöczi T, **Szabó Í**, Farkas E, Penke B, Janáky T, Ilisz I, Berkecz R. (2020) Heart-cutting two-dimensional liquid chromatography coupled to quadrupole-orbitrap high resolution mass spectrometry for determination of N,N-dimethyltryptamine in rat plasma and brain; Method development and application. **J Pharm Biomed Anal** **191**: 113615.

Varga DP*, **Szabó Í***, Varga VÉ, Menyhárt Á, M Tóth O, Kozma M, Bálint AR, Krizbai IA, Bari F, Farkas E. (2020) The antagonism of prostaglandin FP receptors inhibits the evolution of spreading depolarization in an experimental model of global forebrain ischemia. **Neurobiol Dis** **137**: 104780.

Tóth OM, Menyhárt Á, Varga VÉ, Hantosi D, Ivánkovits-Kiss O, Varga DP, **Szabó Í**, Janovák L, Dékány I, Farkas E, Bari F. (2020) Chitosan nanoparticles release nimodipine in response to tissue acidosis to attenuate spreading depolarization evoked during forebrain ischemia. **Neuropharmacology** **162**: 107850.

Szabó Í, M Tóth O, Török Z, Varga DP, Menyhárt Á, Frank R, Hantosi D, Hunya Á, Bari F, Horváth I, Vigh L, Farkas E. (2019) The impact of dihydropyridine derivatives on the cerebral blood flow response to somatosensory stimulation and spreading depolarization. **Br J Pharmacol** **176(9)**: 1222-1234.