BOLDIZSÁR CZÉH

University of Pécs
Szentágothai Research Centre
Structural Neurobiology Research Group

Address: Ifjúság útja 20., H-7624 Pécs, Hungary

RESEARCH AREA

The physiological stress response is essential for our everyday survival, but traumatic or chronic stress represents a strong risk factor for the development of various mental and somatic disorders. The aim of our research is to investigate the functional and structural changes in the brain caused by stress. Such studies help us to understand the pathophysiology of mental disorders such as depression.

We perform clinical studies and we work also with animal models of neuropsychiatric disorders. We employ different imaging methods to examine the cellular alterations that develop under stress. Structural and functional changes in the brain are examined by magnetic resonance imaging (MRI). This method is suitable for determining the volume of different brain structures and for providing information on the microstructure of white matter structures. Functional MRI investigations are suitable for examining brain areas which are specifically activated during cognitive and emotional tasks. The in vivo imaging experiments are complemented by postmortem histological studies, in which we study morphological changes of the cells and neural networks using different microscopic methods.

TECHNIQUES AVAILABLE IN THE LAB

Neuroimaging studies: Principles of magnetic resonance imaging (MRI) in humans and experimental animals. Structural MRI studies: volume measurements of gray and white matter structures, analysis of diffusion tensor images, tractography. Functional MRI studies: BOLD responses related to emotional and cognitive tasks, analysis of resting state functional MRI.

Classic histochemistry methods, immunohistochemistry procedures, light microscopy, fluorescence and confocal microscopy, transmission electron microscopy. 3D neuronal reconstruction and stereological cell counting with Neurolucida systems.

SELECTED PUBLICATIONS

Nagy, S. A., Kürtös, Z., Németh, N., Perlaki, G., Csernela, E., Lakner, F. E., Dóczi, T., **Czéh, B.**, Simon, M. (2021) Childhood maltreatment results in altered deactivation of reward processing circuits in depressed patients: A functional magnetic resonance imaging study of a facial emotion recognition task. **Neurobiol Stress 15:** 100399.

Nagy, S. A., Vranesics, A., Varga, Z., Csabai, D., Bruszt, N., Bali, Z. K., Perlaki, G., Hernádi, I., Berente, Z., Miseta, A., Dóczi, T., **Czéh, B.** (2020) Stress-Induced Microstructural Alterations Correlate With the Cognitive Performance of Rats: A Longitudinal in vivo Diffusion Tensor Imaging Study. **Front Neurosci 14:** 474.

Simon, M., Németh, N., Gálber, M., Lakner, E., Csernela, E., Tényi, T., **Czéh, B.** (2019) Childhood Adversity Impairs Theory of Mind Abilities in Adult Patients With Major Depressive Disorder. **Front Psychiatry 10:** 867.

Czéh, B., Müller-Keuker, J. I., Rygula, R., Abumaria, N., Hiemke, C., Domenici, E., Fuchs, E. (2007) Chronic social stress inhibits cell proliferation in the adult medial prefrontal cortex: hemispheric asymmetry and reversal by fluoxetine treatment. **Neuropsychopharmacology 32:** 1490–1503.

Coe, C. L., Kramer, M., **Czéh, B.**, Gould, E., Reeves, A. J., Kirschbaum, C., Fuchs, E. (2003) Prenatal stress diminishes neurogenesis in the dentate gyrus of juvenile rhesus monkeys. **BiolPsychiatry 54:** 1025–1034.

Czéh, B., Michaelis, T., Watanabe, T., Frahm, J., de Biurrun, G., van Kampen, M., Bartolomucci, A., Fuchs, E. (2001) Stress-induced changes in cerebral metabolites, hippocampal volume, and cell proliferation are prevented by antidepressant treatment with tianeptine. **Proc Natl Acad Sci USA 98:** 12796–12801.