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RESEARCH AREA

Neuroimaging methods are powerful non-invasive tools increasingly deployed to understand the structure and function of the human brain. Structural methods include the quantitative assessment of regional and global grey matter volumes that can be used to monitor cortical atrophy, as well as plastic changes in local grey matter density and geometry. Another popular technique is diffusion tensor imaging, where diffusion-weighted sequences and voxel wise diffusion tensor models are used to describe white matter microstructure and connectivity. Diffusion tensor data can also be used to reconstruct white matter pathways via tractography. The most popular functional method is functional MRI, which exploits hemodynamic changes associated with neural function to investigate task-related and resting state fluctuations in the measured blood oxygen level dependent signal. Analytic techniques that can be used to process functional magnetic resonance imaging data are expanding continuously and include methods that yield information about the network-like functional architecture of the brain, e.g. methods based on functional connectivity, graph theory or spatial statistics.

TECHNIQUES AVAILABLE IN THE LAB

Voxel based morphometry, subcortical volumetry (FSL FIRST), vertex analysis (FSL FIRST), tract based spatial statistics, probabilistic and deterministic tractography, structural connectivity, statistical parametric mapping, analysis of task-based functional MRI data (FSL FEAT, SPM12), psychophysiological interaction analysis, dynamic causal modeling, independent component analysis (FSL MELODIC), dual regression based connectivity analysis, graph theoretical measures, functional cortical gradients..

SELECTED PUBLICATIONS

Vereb, D., Szabo, N., Tuka, B., Tajti, J., Kiraly, A., Farago, P., … Kincses, Z. (2018) Correlation of neurochemical and imaging markers in migraine. PACAP38 and DTI measures. **Neurology 91(12):** e1166–e1174. http://doi.org/10.1212/WNL.0000000000006201

Veréb, D., Szabó, N., Tuka, B., Tajti, J., Király, A., Faragó, P., … Kincses, Z. T. (2020) Temporal instability of salience network activity in migraine with aura. **Pain 161(4):** 856–864. http://doi.org/10.1097/j.pain.0000000000001770

Veréb, D., Tóth, E., Bozsik, B., Király, A., Szabó, N., Kincses, B., … Kincses, Z. T. (2021) Altered brain network function during attention-modulated visual processing in multiple sclerosis. **Mult Scler J** http://doi.org/10.1177/1352458520958360

Szabo, N., Farago, P., Kiraly, A., **Vereb, D.**, Csete, G., Toth, E., … Kincses, Z. (2018) Evidence for Plastic Processes in Migraine with Aura: A Diffusion Weighted MRI Study. **Front Neuroanat 11**. http://doi.org/10.3389/fnana.2017.00138

Toth, E., Farago, P., Kiraly, A., Szabo, N., **Vereb, D.**, Kocsis, K., … Kincses, Z. T. (2019) The Contribution of Various MRI Parameters to Clinical and Cognitive Disability in Multiple Sclerosis. **Front Neuroanat 9.** http://doi.org/10.3389/fneur.2018.01172